

An Illustrated Guide to the



FLOWERS OF SAUDI ARABIA



Sheila Collenette

Though botanical explorations in Arabia date back over 200 years only now is the flora of Saudi Arabia beginning to be systematically studied.

This volume represents a major contribution to the understanding of the flora of Saudi Arabia. It contains over 1700 colour photographs of more than 1500 species excluding grasses and mosses which bear ample witness to the great diversity of the Kingdom's flora. Many of the plants included are recorded for the first time in Saudi Arabia and several are new discoveries to science. The variety of plants emphasises Saudi Arabia's unique position as a meeting point of three major phytogeographic regions.

The plants shown here have all been identified by specialists and the herbarium specimens prepared from the collected material are available for study at the Royal Botanical Gardens at Kew and Edinburgh, in the United Kingdom, and the National Herbarium, at Riyadh, in Saudi Arabia.

Each family has an introduction which, together with the concise description which accompanies each photograph, aids identification and ensures that the work will be of immense value to all students of the Saudi flora.

The book serves, moreover, the important function of recording the status of a large part of Saudi Arabia's flora and will thus enhance the conservation policy of the Kingdom's Meteorology and Environmental Protection Administration. An Arabic version of this book will be available in the future.

Dont Agor.

VI. 88

Zurich

An Illustrated Guide to the Flowers of Saudi Arabia



One of the volcanoes in Harrat Khaybar

An Illustrated Guide to the



Road to Wadi al Uss below Jabal Sawdah

Flowers of Saudi Arabia

Sheila Collenette



Meteorology and Environmental Protection Administration
Kingdom of Saudi Arabia
Flora Publication No. 1 1985

SCORPION PUBLISHING LTD. LONDON

AN ILLUSTRATED GUIDE TO THE FLOWERS OF SAUDI ARABIA

© SCORPION GROUP/MEPA/SHEILA COLLENETTE 1985

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior written permission of the publisher. The copyright of all the photographs unless stated is the author's.

This book was first published in 1985 by Scorpion Publishing Ltd, Victoria House Victoria Road, Buckhurst Hill, Essex, England

ISBN 0 905906 45 4

A SCORPION PICA PRODUCTION

General Editor: Leonard Harrow

House Editor: John Orley

Art Direction and Design: Colin Larkin

Layout and Planning: Roger Kemlo

Artwork and Mechanicals: Dale Dawson

Production: Chris Crossman

Co-ordinator: Susan Pipe

Marketing: Alan Ball

The Publisher would like to acknowledge the kind assistance of the following: John Arnott,

Tony Miller, Rose King, John Carter,

David Holyday and Mick Smith

Typeset by Scorpion Pica

in Linotype New Baskerville

Colour originated by Peak Litho Plates

Printed on 115gsm Sovereign Matt Art

by Penshurst Press Ltd

Bound in Red Bridge Crash Canvas

by Clark Constable 1982 Ltd

Printed in Great Britain



PREFACE

It is with great pride that I introduce this illustrated guide to the wild flowers of the Kingdom of Saudi Arabia.

We have witnessed during the past decade an increasing recognition of the spectacular features of our country – ranging from its vast deserts to its towering mountains, each with its own unique forms of plants and animals.

We have seen this recognition translated into many publications – all quite beautiful – and their ready public acceptance is testimony to a growing, world-wide interest in the natural features of the Kingdom.

We, in the Meteorology and Environmental Protection Administration (MEPA), firmly believe that public awareness of our unique environment is the key to its protection and this present publication, to which MEPA has been pleased to contribute, is only the first in a series of works on the flora of Saudi Arabia which MEPA hopes to sponsor.

And so for these reasons, amongst others, I sincerely recommend to all this wonderful book by Sheila Collett

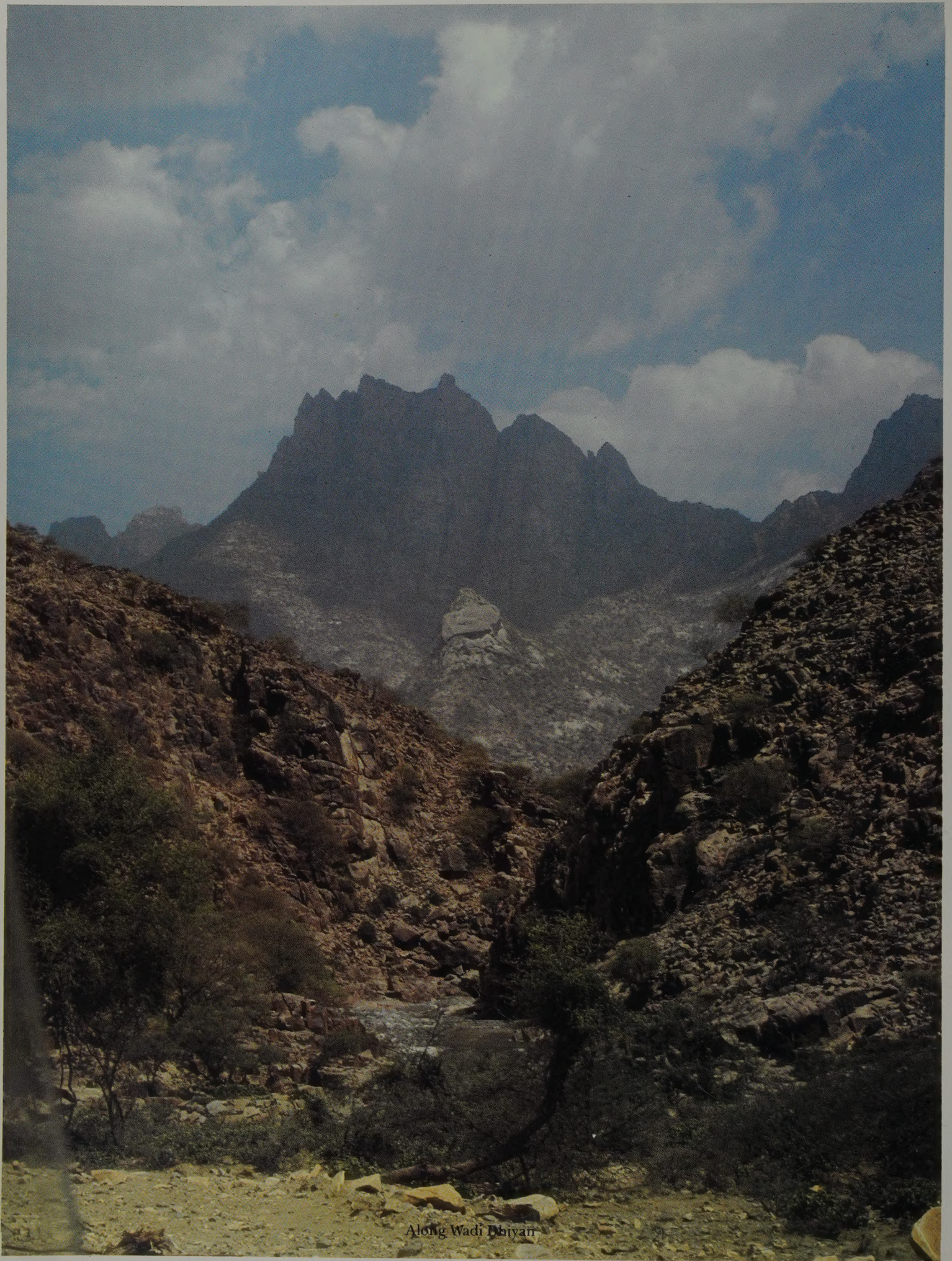
who, with the support of 1700 brilliant colour photographs, has captured the beauty, wealth and diversity of the wild flowers of Saudi Arabia.

This volume is a timely addition to our knowledge and understanding of yet another facet of the natural environment of the kingdom.

I am confident that this publication will quickly appear on the shelves of every botanical enthusiast; I am also convinced that it will enjoy wide acceptance by every layman – Saudi or otherwise – who has come to know and love this area of the Arabian Peninsula.

Dr Abdulbar Al-Gain
Vice President

Meteorological and Environmental Protection Administration



Along Wadi Dhayan

CONTENTS

INTRODUCTION	19
MAP WESTERN AND CENTRAL SAUDI ARABIA	20
MAP DETAIL	21
FOREWORD	22
ACKNOWLEDGEMENTS	24
FAMILIES AND THEIR SPECIES	26

ACANTHACEAE			
Anisotes trisulcus (Forssk.) Vahl	26	Ruellia prostrata T. Anders.	33
Asystasia gangetica (L.) T. Anders.	26	Ruellia sp.	33
Barleria acanthoides Vahl.	27		
Barleria bispinosa (Forssk.) Vahl	27	AGAVACEAE	
Barleria hochstetteri Nees	27	Dracaena serrulata Bak.	34
Barleria sp. aff. hochstetteri Nees	28	Sansevieria abyssinica N.E.Br.	34, 35
Barleria parviflora R.Br.	28	Sansevieria ehrenbergii Schweinf.	
Barleria sp. aff. parviflora R.Br.	28	ex Bak.	35
Barleria proxima Lindau	28		
Barleria trispinosa (Forssk.) Vahl	29	AIZOACEAE	
Blepharis ciliaris (L.) B.L. Burt	29	Aizoon canariense L.	36
Blepharis maderaspatensis (L.) Roth	29	Aizoon hispanicum L.	36
Crossandra wissmannii O. Schwartz	29	Delosperma harazianum	
Ecboium gymnostachyum		(Defl.) Popp. & Ihl.	36
(Nees) Milne-Redh.	30	Corbichonia decumbens	
Ecboium violaceum		(Forssk.) Exell	37
J.R.I. Wood & Hillcoat		Gisekia pharnaceoides L.	37
Ecboium viride (Forssk.) Alston	30	Glinus lotoides L.	37
Hypoestes forskalei		Limeum arabicum Friedr.	37
(Vahl) Roem. & Schult.	31	Limeum obovatum Vicary	38
Justicia flava (Vahl) Vahl	31	Mesembryanthemum nodiflorum L.	38
Justicia heterocarpa T. Anders.	31	Mollugo cerviana L.	38
Justicia odora (Forssk.) Lam.	31	Opophytum forsskahlei	
Lepidagathis scariosa Nees	32	(Hochst. ex Schimp.) N.E.Br.	38
Monechma debile (Forssk.) Nees	32	Sesuvium sesuvioides (Fenzl.) Verdc.	39
Peristrophe paniculata		Trianthema crystallina (Forssk.) Vahl	39
(Forssk.) Brummitt	32	Trianthema sp. nov. aff. crystallina	39
Ruellia grandiflora (Forssk.) Blatter	33	(Forssk.) Vahl	
Ruellia patula Jacq.	33		
Ruellia ? praetermissa Lindau		AMARANTHACEAE	
		Trianthema portulacastrum L.	39
		Trianthema triquetra Willd.	40
		Zaleya pentandra (L.) C. Jeffrey	40
		AMARYLLIDACEAE	
		Achyranthes aspera L.	40
		Achyranthes aspera L. var. sicula L.	41
		Aerva javanica	
		(Burm. f.) Juss. ex J.A. Schultes	41
		Aerva lanata (L.) Juss. ex J.A. Schultes	41
		Alternanthera pungens Kunth	41
		Alternanthera sessilis (L.) R.Br.	42
		Amaranthus graecizans L.	42
		Amaranthus hybridus L.	42
		Amaranthus spinosus L.	42
		Celosia polystachya	
		(Forssk.) C.C. Townsend	43
		Celosia trigyna L.	43
		Digera muricata (L.) Mart.	43
		Psilotrichum gnaphalobryum	
		(Hochst.) Schinz	43
		Pupalia lappacea (L.)	
		Juss. var. velutina (Moq.) Hook.f.	44
		AMARYLLIDACEAE	
		Crinum yemense Defl.	44
		Ixiolirion tataricum	
		(Pallas) Herbert ssp. tataricum	45

Pancratium maximum Forssk.		Ceropegia devechii Chiov.	45	Buglossoides arvensis (L.) I.M. Johnston	78
Pancratium sickenbergeri Asch. & Schweinf. ex Boiss.		Ceropegia sp. aff. devechii Chiov. var. adalaidae Bally	45	Cordia africana Lam.	78
Pancratium tenuifolium Hochst. ex A. Rich		Ceropegia mansouriana Chaudhary & Lavr.	46	Cordia ovalis R.Br. ex DC.	79
Pancratium tortuosum Herbert		Ceropegia superba D.V. Field & Collenette	46	Cordia sinensis Lam.	79
Pancratium sp.		Ceropegia tihamana Chaudhary & Lavr.	46	Cynoglossum bottae Deffl.	80
Scadoxus multiflorus (Martyn) Raf.		Ceropegia sp. aff. variegata Decne.	47	Cynoglossum lanceolatum Forssk.	80
ANACARDIACEAE		Ceropegia sp. nov. 3160		Echiochilon fruticosum Desf.	80
Pistacia falcata Mart.		Ceropegia sp. 3281		Echiochilon sp.	80
Pistacia cf. khinjuk Stocks		Ceropegia sp. 3324A	47	Echium longifolium Del.	81
Rhus abyssinica Steud. ex Oliv.		Ceropegia sp. 3326	48	Ehretia cymosa Thonn.	81
Rhus retinorrhoea Steud. ex Oliv.		Ceropegia sp. 3329	48	Gastrocotyle hispida (Forssk.) Bge.	81
Rhus tripartita (Ucria) Grande		Ceropegia sp. 3603	48	Heliotropium arbainense Fresen.	81
ANNONACEAE		Cynanchum tetrapterum (Turcz.) R.A. Dyer	49	Heliotropium curassavicum L.	82
Annona squamosa L.		Dregea schimperii (Decne.) Bullock		Heliotropium digynum (Forssk.) Asch. & C. Christ.	82
APOCYNACEAE		Duvalia sulcata N.E.Br.		Heliotropium dolosum De Not.	82
Acokanthera schimperii (A. DC.) Benth.		Duvalia sulcata N.E.Br. var. semi-nuda Lavr.		Heliotropium lasiocarpum Fischer & C.A. Meyer	82
Adenium obesum (Forssk.) Roem. & Schult.		Duvalia velutina Lavr.	49	Heliotropium longiflorum Hochst. & Steud.	83
Carissa edulis (Forssk.) Vahl		Glossonema boveanum Decne.		Heliotropium pterocarpum Hochst. & Steud.	
Nerium oleander L.		Glossonema edule N.E.Br.		Heliotropium ramosissimum (Lehm.) DC.	83
Rhazya stricta Decne.		Gomphocarpus fruticosus (L.) R.Br. & Ait. f.		Heliotropium rariflorum Stocks	83
ARACEAE		Gomphocarpus sinaicus Boiss.		Heliotropium strigosum Willd.	84
Sauromatum venosum (Ait.) Kunth		Huernia sp. nov. aff. boleana Gilb.	50	Heliotropium subulatum (DC.) Martelli	84
ARISTOLOCHIACEAE		Huernia lodarensis Lavr.		Hormuzakia aggregata (Lehm.) Guzul.	84
Aristolochia bracteolata Lam.		Huernia sp. 643	50	Lappula sinaica (DC.) Asch. ex Schweinf.	84
ASCLEPIADACEAE		Huernia saudi-arabica D.V. Field	51	Lappula spinocarpus (Forssk.) Asch.	85
Blyttia fruticulosum (Decne.) D.V. Field		Huernia sp. 1176	51	Moltkiopsis ciliata (Forssk.) Johnston	85
Calotropis procera (Ait.) Ait. f.		Huernia sp. 3743	51	Myosotis ramosissima Rochel. ex Schultes	86
Caralluma commutata Berger		Kanahia laniflora (Forssk.) R.Br.		Ogastemma pusillum Brummitt	86
Caralluma sp. aff. commutata Berger		Leptadenia arborea (Forssk.) Schweinf.		Paracaryium intermedium (Fresen.) Lipsky	86
Caralluma deflersiana Lavr.		Leptadenia pyrotechnica (Forssk.) Decne.		Paracaryium cf. rugulosum (DC.) Bornm.	86
Caralluma edulis (Edgew.) Benth.		Odontanthera radians (Forssk.) D.V. Field	52	Trichodesma africanum (L.) R.Br.	87
Caralluma eremastrum Schwartz		Pentatropis spiralis (Forssk.) Decne.		Trichodesma calathiforme Hochst.	87
Caralluma penicillata (Deffl.) N.E.Br.		Pergularia daemia (Forssk.) Chiov.		Trichodesma ehrenbergii Schweinf.	87
Caralluma petraea Lavr.		Pergularia tomentosa L.		BURSERACEAE	
Caralluma plicatiloba Lavr.		Periploca aphylla Decne.	52	Commiphora erythraea (Ehrenb.) Eng.	88
Caralluma russeliana (Courb. ex Brongn.) Cufod.		Periploca sp. nov. aff. laevigata Ait.		Commiphora sp. aff. erythraea (Ehrenb.) Eng.	89
Caralluma quadrangula (Forssk.) N.E.Br.		Rhytidocaulon macrolobum Lavr.		Commiphora gileadensis (L.) C. Christ.	89
Caralluma shadhbana Lavr.		Rhytidocaulon sp. aff. macrolobum Lavr.		Commiphora sp. aff. gileadensis (L.) C. Christ.	89
Caralluma shadhbana Lavr. var. barhana Lavr.		Rhytidocaulon sheilae D.V. Field		Commiphora kataf (Forssk.) Engl.	90
Caralluma sinaica (Decne.) Benth.		Sarcostemma sp. aff. viminale (L.) R.Br.	53	Commiphora kataf (Forssk.) Engl. forma vel sp. aff. 2105	90
Caralluma sinaica (Decne.) Benth. var. baradii Lavr.		Sarcostemma sp. 814	53	Commiphora kataf (Forssk.) Engl. forma vel sp. aff. 3105	90
Caralluma subulata (Forssk.) Decne.		Sarcostemma sp. 1977	54	Commiphora madagascariensis Jacq. forma vel sp. aff. 1466	90
Caralluma wissmanni Schwartz		Sarcostemma sp. 3118	54	Commiphora madagascariensis Jacq. forma vel sp. aff. 3154	91
Ceropegia arabica Huber		Solenostemma oleifolium (Nect.) Bullock & Bruce	54	Commiphora myrrha (Nees) Engl.	91
Ceropegia sp. aff. arabica Huber		BARBEYACEAE		Commiphora sp. nov. aff. myrrha (Nees) Engl.	91
Ceropegia sp. nov. aff. aristolochioides Decne.		Barbeya oleoides Schweinf.	56	Commiphora quadricincta Schweinf.	91
BORAGINACEAE		BORAGINACEAE		CAMPANULACEAE	
Alkanna orientalis (L.) Boiss.	57	Alkanna orientalis (L.) Boiss.	57	Campanula dulcis Decne.	92
Anchusa aegyptiaca (L.) DC.	57	Anchusa aegyptiaca (L.) DC.	57	Campanula edulis Forssk.	92
Anchusa affinis R.Br. ex DC.	58	Anchusa affinis R.Br. ex DC.	58		
Anchusa milleri Willd.	58	Anchusa milleri Willd.	58		
Arnebia decumbens (Vent.) Coss. & Kral	58	Arnebia decumbens (Vent.) Coss. & Kral	58		
Arnebia hispidissima (Lehm.) DC.	59	Arnebia hispidissima (Lehm.) DC.	59		
Arnebia tetragyna Forssk.	59	Arnebia tetragyna Forssk.	59		
Asperugo procumbens L.	59	Asperugo procumbens L.	59		
Brandella erythraea (Brand) Mill.	59	Brandella erythraea (Brand) Mill.	59		

Campanula sp. aff. edulis Forssk.
Campanula sp.
Wahlenbergia lobelioides (L.f.) A. DC.

CAPPARACEAE

Boscia angustifolia A. Rich.
Cadaba farinosa Forssk.
Cadaba glandulosa Forssk.
Cadaba longifolia DC.
Cadaba rotundifolia Forssk.
Capparis cartilaginea Decne.
Capparis decidua (Forssk.) Edgw.
Capparis spinosa L.
Capparis tomentosa Lam.
Cleome amblyocarpa
Barratte & Murb.
Cleome brachycarpa Vahl
Cleome brachystyla Deff.
Cleome chrysantha Decne.
Cleome droserifolia Del.
Cleome sp. aff. droserifolia Del.
Cleome paradoxa R.Br.
Cleome scaposa DC.
Cleome schweinfurthii Gilg
Cleome trinervia (DC.) Hedge
Cleome viscosa L.
Dipterygium glaucum Decne.
Gynandropsis gynandra (L.) Briq.
Maerua crassifolia Forssk.
Maerua oblongifolia (Forssk.) A. Rich.
Maerua triphylla Rich.

CAPRIFOLIACEAE

Lonicera etrusca Santi

CARYOPHYLLACEAE

Arenaria leptoclados
(Reichenb.) Guss. (forma)
Arenaria ? serpyllifolia L.
Cerastium dichotomum L. var.
inflatum (Link) Cullen
Cometes abyssinica R.Br.
Cometes surattensis L.
Dianthus sinaicus Boiss.
Dianthus strictus Banks & Sol.
Dianthus uniflorus Vahl
Dianthus zonatus Fenzl.
Gymnocarpus decandrum Forssk.
Gypsophila antari Post & Beauv.
Gypsophila sp. aff. antari
Post & Beauv.
Gypsophila sp.
Herniaria hirsuta L.
Holosteum umbellatum L. var.
glutinosum (M. Bieb.) Gay
Minuartia filifolia
Forssk. Schweinf. ex Mattf.
Minuartia picta
(Sibth. & Smith) Bornm.
Paronychia arabica (L.) Del.
Paronychia argentea Schur
Paronychia chlorothyrsa Murb.
Polycarpaea repens (Forssk.) Asch.
Polycarpaea spicata Wight & Arn.
Polycarpon tetraphyllum (L.) L.
Pteranthus dichotomus Forssk.
Robbairaea delileana Milne-Redh.
Saponaria umbriicola J.R.I. Wood
Scleranthus annuus L.

92 Sclerocephalus arabicus Boiss.
93 Silene apetala Willd.
93 Silene arabica Boiss.
Silene sp. aff. burchellii Oth.
Silene coniflora Nees
Silene conoidea L.
Silene gallica L. var. quinquevulnera L.
Silene linearis Decne.
Silene macrosolen Steud. ex A. Rich.
Silene schimperana Boiss.
Silene villosa Forssk.
Silene vulgaris (Moench) Garcke
Silene yemensis Deff. p.p.
Silene sp. 1912
Silene sp. 4540
Spergula fallax (Lowe) Krause
Spergularia bocconii
(Scheele) Asch. & Graebn.
Spergularia diandra
(Guss.) Heldr. & Sart.
Spergularia rubra (L.) J. & C. Presl.
Telephium sphaerospermum Boiss.
Velezia rigida L. sensu lato

CELASTRACEAE

Maytenus heterophylla
(Eklon & Zeyher) N. Robson
Maytenus senegalensis (Lam.) Exell
Maytenus somalensis (Loes.) Cufod.
Maytenus undata (Thunb.) Blakelock
Maytenus sp.

CHENOPODIACEAE

100 Aellenia subaphylla (C.A. Mey.) Aellen
Anabasis cf. ehrenbergii Schweinf.
Anabasis setifera Moq.
Arthrocnemum glaucum
(Del.) Ung.-Sternb.
Arthrocnemum macrostachyum
(Moris.) Moris. & Delponte
Atriplex dimorphostegia Kar. & Kir.
Atriplex farinosa Forssk.
Atriplex leucoclada Boiss.
Bassia eriophora (Schrud.) Kuntze
Bassia muricata (L.) Asch.
Beta vulgaris L.
Beta sp.
Bienertia cycloptera Bunge
Chenopodium album L.
Chenopodium ambrosioides L.
Chenopodium murale L.
Chenopodium opulifolium
Schrud. ex Koch & Ziz
Chenopodium schraderianum
Schultes
Cornulaca monacantha Del.
Cornulaca sp.
Halocnemum strobilaceum
(Pall.) M. Bieb.
Halogeton sp.
Halopeplis perfoliata (Forssk.) Bunge
Haloxylon ammodendron
(Cam.) Bunge
Hammada salicornica (Moq.) Iljin
Hammada scoparia (Pomel) Iljin
Kochia indica Wight
Noaea mucronata
(Forssk.) Asch. & Schweinf.
Salsola sp. aff. alopecuroides
(Del.) Botsch.
Salsola baryosma
(Roem. & Schult.) Dandy

107 Salsola bottae (Jaub. & Spach) Boiss. 123
107 Salsola imbricata Forssk. 123
108 Salsola inermis Forssk. 123
108 Salsola kali L. 124
108 Salsola cf. schweinfurthii Solms-Laub. 124
108 Salsola spinescens Moq. 124
109 Salsola tetrandra Forssk. 124
109 Salsola ? vermiculata L. 125
109 Salsola volkensii Schweinf. & Asch. 125
109 Salsola sp. 2442 125
110 Salsola sp. 2768 126
110 Salsola sp. 2840 126
110 Salsola sp. 3840 126
110 Seidlitzia rosmarinus Bunge 126
111 Suaeda aegyptiaca (Hasselq.) Zoh. 127
111 Suaeda fruticosa Forssk. ex Gmel. 127
Suaeda hortensis Forssk. 127
Suaeda monoica Forssk. ex J.F. Gmel. 127
Suaeda pruinosa Lange 128
Suaeda schimperi (Moq.) Ulbrich 128
Suaeda cf. vermiculata Forssk. 128
Suaeda sp. 1058 128
Suaeda sp. 3841 129
Traganum undatum Del. 129

CISTACEAE

113 Fumana arabica (L.) Spach 129
113 Helianthemum kahiricum Del. 130
114 Helianthemum ledifolium Spach 130
114 Helianthemum lippii
(L.) Dum. -Cours. 130
114 Helianthemum salicifolium (L.) Miller 131
Helianthemum stipulatum
(Forssk.) Christen. 131

COMBRETACEAE

Combretum aculeatum Vent. 131
Combretum molle R.Br. ex D. Don 132
Terminalia brownii Fresen. 132

COMMELINACEAE

Commelina africana L. var. villosior
(C.B.Cl.) Brenan 133
Commelina albescens Hassk. 133
Commelina sp. aff. albescens Hassk. 133
Commelina benghalensis L. 134
Commelina forsskahlei Vahl 134
Cyanotis nictitropa Deff. 134

COMPOSITAE

Aaronsohnia factorovskyi Warb. & Eig 135
Acantholepis orientalis Boiss. 135
Achillea biebersteinii Afan. 136
Achillea fragrantissima
(Forssk.) Sch. Bip. 136
Ageratum conyzoides L. 136
Ambrosia maritima L. 136
Anthemis deserti Boiss. 137
Anthemis pseudocotula Boiss. 137
Anthemis sp. 3562 137
Anvillea garcinii (Burm.) DC. 138
Artemisia abyssinica Sch. Bip. 138
Artemisia judaica L. 138
Artemisia monosperma Del. 139
Artemisia scoparia Waldst. & Kit. 139
Artemisia sieberi Besser 139
Aster squamatus (Spr.) Hieron 139

Asteriscus graveolens Less.	140	Kleinia sp.	158	Senecio hoggariensis Batt. & Traub.	174
Asteriscus pygmaeus		Koelpinia linearis Pall.	158	Senecio schimperi Sch. Bip.	174
(DC.) Coss. & Dur.	140	Lactuca dissecta D. Don	159	Senecio sumarae Deffl.	174
Atractylis arabica Rech. f.	140	Lactuca inermis Forssk.		Silybum marianum (L.) Gaertn.	174
Atractylis cancellata L.	140	(auct. capensis Thunb.)	159	Sonchus asper (L.) Hill	175
Atractylis carduus (Forssk.) Christ.	141	Lactuca sp. aff. sativa L.	159	Sonchus oleraceus L.	175
Bidens biternata (Lour.) Merr.	141	Lactuca serriola L.	159	Sonchus tenerrimus L.	175
Blumea aurita DC.	141	Lasiopogon muscoides (Desf.) DC.	160	Tagetes minuta L.	175
Blumea bovei (DC.) Vatke	141	Launaea acanthodes		Tanacetum sinaicum (Fresen.) ined.	176
Blumea gariepina DC.	142	(Boiss.) O. Kuntze	160	Tanacetum sp. 4274	176
Calendula arvensis L.	142	Launaea angustifolia (Desf.) Muschl.	160	Tarchonanthus camphoratus L.	176
Calendula tripterocarpa Rupr.	142	Launaea capitata (Spreng.) Dandy	160	Tragopogon dubius Scop.	176
Carduus getulus Pomel.	142	Launaea cassiniana		Urospermum picroides (L.)	
Carduus pycnocephalus L.	143	(Jaub. & Spach) Kuntze	161	F.W. Schmidt	177
Carthamus nitidus Boiss.	143	Launaea intybacea (Jacq.) Beauv.	161	Varthemia iphionoides	
Carthamus oxyacantha M. Bieb.	143	Launaea massauensis		Boiss. & Blanche	177
Centaurea ammocyanus Boiss.	143	(Fresen.) Sch. Bip. ex Kuntze	161	Verbesina encelioides Gaertn.	177
Centaurea eryngioides Lam.	144	Launaea mucronata (Forssk.) Christ.	161	Vernonia abyssinica Sch. Bip.	178
Centaurea mesopotamica Bornm.	145	Launaea nudicaulis (L.) Hook. f.	162	Vernonia cinerascens Sch. Bip.	178
Centaurea pseudosinaica Czerep.	145	Launaea procumbens		Vernonia cinerea (L.) Less.	178
Centaurea schimperi DC.	145	(Roxb.) Ramayya & Rajagopal	162	Volutaria albicaulis (Deffl.) ined.	178
Centaurea scoparia Sieb.	146	Leontodon laciniatus (Bertol.) Bornm.	162	Voluntaria lippii L.	178
Centaurea sinaica DC.	146	Leysera leyseroides (Desf.) Maire	162	Xanthium cf. pungens Wallr.	179
Centaurea cf. sinaica DC.	146	Onopordon heteracanthum C.A. Mey.	162	Xanthium spinosum L.	179
Centaurea solstitialis L. ssp. solstitialis	146	Onopordon sibthorpiatum		Xanthium strumarium L.	179
Centaurothamnus maximus		Boiss. & Heldr.	163	Zoegea purpurea Fresen.	179
Wagenitz & Ditt.	147	Osteospermum vaillantii			
Cichorium bottae Deffl.	147	(Decne.) Norl.	163		
Cichorium intybus L.	147	Pegolettia senegalensis Cass.	163		
Cineraria abyssinica Sch. Bip.	147	Phagnalon barbeyanum			
Cirsium vulgare L.	148	Asch. & Schweinf.	163		
Cnicus benedictus L.	148	Phagnalon rupestre DC.	164	Astripomoea malvacea	
Conyza bonariensis (L.) Cronq.	148	Phagnalon cf. saxatile (L.) Cass.	164	(Klotzsch) Meuse	180
Conyza gouanii (L.) Willd.	148	Phagnalon scalarum Schwartz	164	Convolvulus arvensis L.	180
Conyza hochstetteri Sch. Bip.	149	Phagnalon sp. aff. scalarum Schwartz	164	Convolvulus cephalopodus Boiss.	181
Conyza incana Willd.	149	Phagnalon sinaicum		Convolvulus deserti Hochst.	181
Conyza pyrrhopappa Sch. Bip.	149	Bornm. & Kneuch.	165	Convolvulus fatmensis Kunze	181
Conyza stricta Willd.	149	Phagnalon sp. 1801	165	Convolvulus glomeratus Choisy	181
Crassocephalum bojeri DC.	150	Phagnalon sp. 4383	165	Convolvulus hystrix Vahl	182
Crepis foetida L.	150	Picris abyssinica Sch. Bip.	165	Convolvulus lanatus Vahl	182
Crepis ruepellii Sch. Bip.	150	Picris sp. 933	166	Convolvulus oxyphyllus Boiss.	182
Crepis sancta (L.) Bab.	150	Picris sp. 1816	166	Convolvulus pilosellifolius Desr.	182
Crepis sp.	151	Picris sp. 3240	166	Convolvulus prostratus Forssk.	183
Cymbolaena griffithii		Picris sp. 4271	166	Convolvulus rhyniospermus Hochst.	
(A. Gray) Wagenitz	151	Pluchea dioscoridis DC.	167	ex Choisy	183
Dichrocephala crysanthemifolia		Psiadia punctulata DC.	167	Convolvulus sicalus L.	183
(Blume) DC.	151	Pulicaria arabica (L.) Cass.	167	Convolvulus spicatus	
Dicoma tomentosa Cass.	151	Pulicaria crispa		Peter ex Hallier f.	183
Echinops glaberrimus DC.	152	(Forssk.) Benth. & Hook. f.	167	Convolvulus sp. nov.	184
Echinops spinosissimus Turra	152	Pulicaria glutinosa Jaub. & Spach	168	Cressa cretica L.	184
Echinops viscosus DC.	152	Pulicaria guestii Rech. f. & Rawi	168	Cuscuta campestris Yuncker	184
Echinops sp. 1570	152	Pulicaria incisa (auct. undulata)		Cuscuta hyalina Roth.	184
Echinops sp. 3761	153	(Lam.) DC.	168	Cuscuta planiflora Tenore	185
Echinops sp. 4116	153	Pulicaria inuloides (Poir.) DC.	168	Dichondra repens J. R. & G. Forst.	185
Eclipta alba (L.) Hassk.	153	Pulicaria jaubertii Gamel-Eldin	169	Evolvulus alsinoides L.	185
Euryops arabicus Steud.	153	Pulicaria petiolaris Jaub. & Spach	169	Falkia oblonga Krauss	185
Felicia abyssinica A. Rich.	154	Pulicaria schimperi DC.	169	Ipomoea eriocarpa R.Br.	186
Felicia dentata (A. Rich.) Dandy	154	Pulicaria somalensis O. Hoffm.		Ipomoea obscura (L.) Ker-Gawl.	186
Filago desertorum (Pomel) Wag.	154	ssp. somalensis	169	Ipomoea sinensis (Desv.) Choisy ssp.	
Flaveria trinerva (Spreng.) Mohr.	154	Pulicaria vulgaris Gaertn.	170	blepharosepala (A. Rich.) Meeuse	186
Gnaphalium luteo-album L.	155	Reichardia tingitana (L.) Roth	170	Merremia semisagitta (Peter) Dandy	186
Gymnarrhena micrantha Desf.	155	Reichardia tingitana (L.) Roth var.		Merremia tridentata (L.) Hall f. var.	
Hedypnois cretica (L.) Dum. -Cours.	155	arabica (Hochst. & Steud.)		angustifolia (Jacq.) Van Ooststr.	187
Helichrysum foetidum L. var.		Asch. & Schweinf.	170	Seddera arabica (Forssk.) Choisy	187
microcephalum A. Rich.	155	Rhagadiolus stellatus (L.) Willd.	170	Seddera latifolia Hochst. & Steud.	187
Helichrysum forsskahlei		Rhanterium epapposum Oliv.	171	Seddera virgata Hochst. & Steud.	187
(Gmel.) Hilliard & Burt	156	Scariola orientalis (Boiss.) Sojak	171		
Helichrysum glumaceum DC.	156	Scorzonera intricata Boiss.	171		
Hochstettera schimperi DC.	156	Scorzonera papposa DC.	171		
Hypochoeris glabra L.	156	Scorzonera rawii Guest & Rech. f.	172		
Ifloga spicata (Forssk.) Sch. Bip.	157	Scorzonera schweinfurthia Boiss.	172	Crassula alba Forssk.	188
Iphiona mucronata		Scorzonera tortuosissima Boiss.	172	Crassula schimperi Fisch. & Mey.	189
(Forssk.) Asch. & Schweinf.	157	Senecio asirensis Boulos & J.R.I. Wood	172	Kalanchoe alternans (Vahl) Pers.	189
Iphiona scabra DC.	157	Senecio deltoideus Less.	173	Kalanchoe citrina Schweinf.	189
Iphiona sp. 4138	157	Senecio flavus (Decne.) Sch. Bip.	173	Kalanchoe crenata (Andr.) Haw.	190
Kleinia odora (Forssk.) DC.	158	Senecio glaucus L.	173	Kalanchoe glaucescens Brit.	190
Kleinia pendula (Forssk.) Sch. Bip.	158	Senecio hadiensis Forssk.	173	Kalanchoe sp. aff. glaucescens Brit.	190

CONVOLVULACEAE

Astripomoea malvacea	
(Klotzsch) Meuse	180
Convolvulus arvensis L.	180
Convolvulus cephalopodus Boiss.	181
Convolvulus deserti Hochst.	181
Convolvulus fatmensis Kunze	181
Convolvulus glomeratus Choisy	181
Convolvulus hystrix Vahl	182
Convolvulus lanatus Vahl	182
Convolvulus oxyphyllus Boiss.	182
Convolvulus pilosellifolius Desr.	182
Convolvulus prostratus Forssk.	183
Convolvulus rhyniospermus Hochst.	
ex Choisy	183
Convolvulus sicalus L.	183
Convolvulus spicatus	
Peter ex Hallier f.	183
Convolvulus sp. nov.	184
Cressa cretica L.	184
Cuscuta campestris Yuncker	184
Cuscuta hyalina Roth.	184
Cuscuta planiflora Tenore	185
Dichondra repens J. R. & G. Forst.	185
Evolvulus alsinoides L.	185
Falkia oblonga Krauss	185
Ipomoea eriocarpa R.Br.	186
Ipomoea obscura (L.) Ker-Gawl.	186
Ipomoea sinensis (Desv.) Choisy ssp.	
blepharosepala (A. Rich.) Meeuse	186
Merremia semisagitta (Peter) Dandy	186
Merremia tridentata (L.) Hall f. var.	
angustifolia (Jacq.) Van Ooststr.	187
Seddera arabica (Forssk.) Choisy	187
Seddera latifolia Hochst. & Steud.	187
Seddera virgata Hochst. & Steud.	187

CRASSULACEAE

Crassula alba Forssk.	188
Crassula schimperi Fisch. & Mey.	189
Kalanchoe alternans (Vahl) Pers.	189
Kalanchoe citrina Schweinf.	189
Kalanchoe crenata (Andr.) Haw.	190
Kalanchoe glaucescens Brit.	190
Kalanchoe sp. aff. glaucescens Brit.	190

Kalanchoe sp. aff. laciniata DC.
Kalanchoe lanceolata (Forssk.) Pers.
Sedum hispanicum L.
Umbilicus erectus DC.
Umbilicus horizontalis Boiss.
var. intermedius Boiss.

CRUCIFERAE

Alyssum desertorum Stapf
 Alyssum homalocarpum
 (Fisch. & Mey.) Boiss.
 Alyssum linifolium Steph. & Willd.
 Anastatica hierochuntica L.
 Arabidopsis hederifolia (Bornm.)
 O. E. Schulz
 Arabidopsis thaliana (L.) Heyn
 Arabis alpina L.
 Arabis sp.
 Biscutella didyma L.
 Brassica rapa L.
 Brassica tournefortii Gouan
 Cakile arabica Velen.
 Capsella bursa-pastoris (L.) Medic.
 Cardaria draba (L.) Desv.
 Carrichtera annua (L.) DC.
 Chorispura purpurascens
 (Banks & Sol.) Eig
 Clypeola jonthlaspi L.
 Diplotaxis acris (Forssk.) Boiss.
 Diplotaxis erucoides (L.) DC.
 Diplotaxis harra (Forssk.) Boiss.
 Eremobium aegyptiacum (Spreng.)
 Boiss.
 Eremobium aegyptiacum (Spreng.)
 Boiss. ssp. lineare (Del.)
 Asch. & Schweinf.
 Eruca sativa Mill.
 Erucaria crassifolia (Forssk.) Del.
 Erucaria hispanica (L.) Druce
 Erucastrum arabicum Fisch. & Mey.
 Farsetia aegyptia Turra
 Farsetia burtonae Oliv.
 Farsetia longisiliqua Decne.
 Farsetia ramosissima Hochst. ex Boiss.
 Horwoodia dicksoniae Turrill
 Isatis lusitanica L.
 Lepidium aucheri Boiss.
 Lepidium sativum L.
 Lobularia libyca (Viv.) Meisner
 Malcolmia chia (L.) DC.
 Malcolmia crenulata (DC.) Boiss.
 Malcolmia grandiflora (Bunge)
 O. Kuntze var. glabrescens
 (Boiss.) Burt & Lewis
 Malcolmia sp.
 Maresia pygmaeus Pomel.
 Matthiola longipetala (Vent.) DC.
 Morettia canescens Boiss.
 Morettia parviflora Boiss.
 Moricandia sinaica (Boiss.) Boiss.
 Nasturtium officinale R. Br.
 Neslia apiculata Fisch.,
 C. A. Mey. & Ave-Lall.
 Notoceras bicorne (Ait.) Carnel
 Physorrhynchus sp. aff.
 chamaerapistrum (Boiss.) Boiss.
 Raphanus sativus L.
 Savignya parviflora (Del.) Webb
 Schimperia arabica Hochst. & Steud.
 Schouwia purpurea
 (Forssk.) Schweinf.
 Sinapis arvensis L.
 Sisymbrium erysimoides Desf.
 Sisymbrium irio L.
 Sisymbrium loeselii L.

190 *Sisymbrium orientale* L.
191 *Sisymbrium sepulatum* DC.
191 *Torularia torulosa* (Desf.) O.E. Schulz
191 *Zilla spinosa* (L.) Prantl

CUCURBITACEAE

192 *Citrullus colocynthis* (L.) Schrad.
192 *Citrullus lanatus*
(Thunb.) Mats. & Nakai
192 *Coccinea grandis* (L.) J.O. Voigt
192 *Corallocarpus epigeus*
(Roettl.) C.B.Cl.
192 *Corallocarpus schimperii*
(Naud.) Hook. f.
193 *Ctenolepis cerasiformis*
(Stocks) Hook. f.
194 *Cucumis figarei* Del. ex Naud.
194 *Cucumis melo* L.
194 *Cucumis melo* L. var. *agrestis* Naud.
194 *Cucumis prophetarum* L. var.
195 *dissectus* (Naud.) C. Jeffrey
195 *Cucumis prophetarum* L. var.
195 *prophetarum*
195 *Cucumis* sp. aff. *prophetarum* L.
196 *Kedrostis foetidissima* (Jacq.) Cogn.
196 *Kedrostis gijef* (J.F. Gmel.) C. Jeffrey
196 *Momordica balsamina* L.
196 *Zehneria anomala* C. Jeffrey
196 *Zehneria scabra* (L.) Sond.
197

CUPRESSACEAE

197 *Juniperus excelsa* M. Bieb.
Juniperus phoenicea L.

CYNOMORIACEAE

199
200 Cynomorium coccineum L.

CYPERACEAE

201 *Carex distans* L.
201 *Carex divisa* Huds.
201 *Cyperus alopecuroides* Rottb.
202 *Cyperus alternifolius* L. ssp.
202 *flabelliformis* Rottb.
Cyperus articulatus L. 217
Cyperus aucheri Jaub. & Spach
202 *Cyperus conglomeratus* Rottb.
203 *Cyperus conglomeratus* Rottb. var.
203 *effusus* (Rottb.) Kukk.
203 *Cyperus jemicus* Rottb.
203 *Cyperus laevigatus* L.
204 *Cyperus laevigatus* L. var.
204 *caespitosus* C. B. Cl.
204 *Cyperus michelianus* (L.) Del. ssp.
pygmaeus (Rottb.) Asch. & Graebn.
204 *Cyperus niveus* Retz.
205 *Cyperus obtusiflorus* Vahl
Cyperus rigidifolius Steud.
205 *Cyperus rotundus* L.
205 *Cyperus rubicundus* Vahl
205 *Cyperus schimperianus* Steud.
206 *Cyperus* sp. aff. *schimperianus* Steud.
Eleocharis sp. aff. *atropurpurea*
(Retz.) Presl
206 *Eleocharis marginulata* Hochst.
206 *Fimbristylis bisumbellata*
207 (Forssk.) Bub.
207 *Fimbristylis sieberiana* Kunth

207	<i>Fimbristylis spathacea</i> Roth	222
207	<i>Fuirena pubescens</i> (Lam.) Kunth	222
208	<i>Mariscus schimperii</i> A. Rich. var.	
208	<i>viridis</i> (Schweinf.) C.B.Cl.	222
	<i>Mariscus squarrosus</i> (L.) C.B.Cl.	223
	<i>Pycneus elegantulus</i> (Steud.) C.B.Cl.	223
	<i>Pycneus sanguinolentus</i> Vahl	223
	<i>Scirpus brachyceras</i> Hochst.	
	ex A. Rich.	223
209	<i>Scirpus holoschoenus</i> L.	224
	<i>Scirpus litoralis</i> Schrad.	224
210	<i>Scirpus setaceus</i> L.	224

DIPSACACEAE

210	<i>Pterocephalus pulverulentus</i>	
211	Boiss. & Bal. ex Boiss.	225
211	<i>Pterocephalus</i> sp. nov.	225
211	<i>Scabiosa columbaria</i> L.	226
211	<i>Scabiosa olivieri</i> Coult.	226
	<i>Scabiosa palaestina</i> L.	226

EBENACEAE

212	<i>Diospyros mespiliformis</i> Hochst.	
213	ex DC.	227
213	<i>Euclea schimperi</i> (A. DC.) Dandy	228

ELANTINACEAE

<i>Bergia polyantha</i> Sond.	229
<i>Bergia suffruticosa</i> (Del.) Fenzl	229

EPHEDRACEAE

	Ephedra alata Decne.	230
	Ephedra sp. aff. alata Decne.	230
215	Ephedra sp. aff. foliata Boiss. ex C.A. Mey. 2243	231
	Ephedra sp. aff. foliata Boiss. ex C.A. Mey 1410	231
	Ephedra intermedia Schrenk & C.A. Mey.	232
216	Ephedra cf. transitoria Riedl	232
217	Ephedra sp. 1491	232

EQUISETACEAE

218 *Equisetum ramosissimum* Desf. 233

ERICACEAE

Erica arborea L. 233

EUPHORBIACEAE

219	<i>Acalypha fruticosa</i> Forssk.	234
220	<i>Acalypha indica</i> L.	234
220	<i>Acalypha racemosa</i> Baill.	234
220	<i>Andrachne aspera</i> Spreng.	235
221	<i>Andrachne aspera</i> Spreng. var. <i>glandulosa</i> Hochst. ex A. Rich.	235
221	<i>Andrachne telephioides</i> L.	235
221	<i>Chrozophora oblongifolia</i> (Del.) Juss. ex Spreng.	235
221	<i>Chrozophora tinctoria</i> (L.) Raf.	236
222	<i>Cluytia myricoides</i> Jaub. & Spach	236

Croton lobatus L.
Dalechampia scandens L. var.
cordofana (Hochst. ex Webb)
Muell. Arg.
Erythrocoeca abyssinica Pax
Euphorbia ammak Schweinf.
Euphorbia sp. aff. ammak Schweinf.
Euphorbia arabica
(Hochst. & Steud.) Boiss.
Euphorbia balsamifera Ait. ssp.
adenensis (Defl.) Bally
Euphorbia cactus Ehrenb.
Euphorbia sp. aff. cactus Ehrenb.
Euphorbia chamaepeplus
Boiss. & Gaill.
Euphorbia cuneata L.
Euphorbia dracunculoides Lam.
Euphorbia falcata L. ssp. falcata
var. falcata
Euphorbia fractiflexa
S. Carter & J.R.I. Wood
Euphorbia sp. aff. fractiflexa
S. Carter & J.R.I. Wood
Euphorbia glomerifera
(Millsp.) Wheeler
Euphorbia gorinii Chiov.
Euphorbia granulata Forssk.
Euphorbia granulata Forssk. var.
glabrata (Gay) Boiss.
Euphorbia helioscopia L.
Euphorbia heterophylla L.
Euphorbia hirta L.
Euphorbia inaequilatera Sond.
Euphorbia inarticulata Schweinf.
Euphorbia sp. aff. parciramulosa
Schweinf.
Euphorbia retusa Forssk.
Euphorbia schimperii Presl
Euphorbia sp. aff. schimperii Presl
Euphorbia schimperiana Scheele
Euphorbia scordifolia Jacq.
Euphorbia serpens Kunth
Euphorbia triaculeata Forssk.
Euphorbia sp.
Jatropha glauca Vahl
Jatropha pelargoniifolia Courb.
Jatropha spinosa (Forssk.) Vahl
Mercurialis annua L.
Phyllanthus maderaspatensis L.
Phyllanthus rotundifolius
Klein ex Willd.
Phyllanthus tenellus Muell. Arg.
var. arabicus Muell. Arg.
Ricinus communis L.
Securinega virosa (Roxb. ex Willd.)
Baill.
Tragia pungens (Forssk.) Muell. Arg.

FRANKENIACEAE

Frankenia pulverulenta L.

GENTIANACEAE

Centaurium pulchellum (Sw.) Druce
Centaurium sp.
Enicostemma axillare
(Lam.) A. Raynal
Sabaea sp.
Swertia sp. aff. polynectaria
(Forssk.) Gilg

236

GERANIACEAE

Erodium ciconium (L.) L'Her.
Erodium cicutarium (L.) L'Her.
Erodium crassifolium L'Her.
Erodium deserti (Eig) Eig
Erodium glaucophyllum (L.) Ait.
Erodium laciniatum (Cav.) Willd.
var. glanduloso-pilosum Viern.
Erodium moschatum (L.) L'Her.
Erodium neuradifolium Del.
Erodium oxyrrhynchum M. Biel.
Erodium pulverulentum (Cav.) Willd.
Geranium arabicum Forssk.
Geranium mascatense Boiss.
Geranium molle L.
Geranium ocellatum Camb.
Geranium rotundifolium L.
Geranium trilophum Boiss.
Geranium sp. aff. trilophum Boiss.
Monsonia heliotropioides (Cav.) Boiss.
Monsonia nivea (Decne.)
Decne. ex Webb
Monsonia senegalensis Guill. & Perr.
Pelargonium alchemilloides (L.)
L'Her. ex Ait.
Pelargonium alchemilloides (L.)
L'Her. ex Ait. ssp. multibracteatum
Hochst. ex Rich.

GLOBULARIACEAE

Globularia arabica Jaub. & Spach

HALORAGACEAE

Myriophyllum spicatum L.

HYDNORACEAE

Hydnora johannis Becc.

HYPERICACEAE

Hypericum annulatum Moris
Hypericum hircinum L.
Hypericum revolutum Vahl
Hypericum sp. aff. sinaicum
Hochst. ex Boiss.

IRIDACEAE

Gladiolus dalenii Van Geel
Gynandris sisyrinchium (L.) Parl.
Iris albicans Lange
Iris postii Nouterde
Oenostachys abyssinica
(A. Brongn.) N.E.Br.
Romulea fischeri Pax

JUNCACEAE

Juncus bufonius L.
Juncus fontanesii Gay ssp.
pyramidata (Laharpe) Snog.
Juncus punctorius L.f.
Juncus rigidus Desf.

LABIATAE

Ajuga arabica P. Davis
Ajuga bracteosa Wall.
Ajuga chamaepitys (L.) Schreb. ssp.
tridactylites (Benth.) P. Davis
Ballota undulata (Fres.) Benth.
Ballota sp. nov.
Becium filamentosum (Forssk.) Chiov.
Becium serpyllifolium (Forssk.)
J.R.I. Wood ined.
Endostemon gracile (Benth.) Ashby
Endostemon tenuiflorus
(Benth.) Ashby
Lallemantia royleana Benth.
Lamium amplexicaule L.
Lavandula atriplicifolia Benth.
Lavandula citriodora A.G. Miller.
Lavandula dentata L.
Lavandula pubescens Decne.
Lavandula stricta Del.
Leucas alba (Forssk.) Sebald
Leucas glabrata (Vahl) R.Br.
Leucas inflata Benth.
Leucas neuflizeana Courb.
Leucas urticifolia (Vahl) R.Br.
Marrubium vulgare L.
Mentha longifolia L. ssp. schimperii
(Briq.) Briq.
Meriandra benghalensis Benth.
Micromeria biflora Benth.
Micromeria biflora (Ham.) Benth. ssp.
arabica K. Walth.
Micromeria imbricata
(Forssk.) Christen.
Micromeria sp. nov. 2574
Micromeria sp. 3247
Nepeta deflersiana Schweinf.
ex Hedge
Nepeta sheilae Hedge & King
Ocimum basilicum L.
Ocimum hadiense Forssk.
Origanum syriacum L.
Orthosiphon pallidus Royle
Otostegia fruticosa (Forssk.)
Schweinf. ex Penzig ssp. schimperii
(Benth.) Sebald
Phlomis sp. nov.
Plectranthus arabicus E.A. Bruce
Plectranthus asirensis
J.R.I. Wood ined.
Plectranthus barbatus Andr.
Plectranthus sp. nov. aff.
barbatus Andr.
Plectranthus cylindraceus
Hochst. ex Benth.
Plectranthus marrubioides
Hochst. & Benth.
Plectranthus tenuiflorus
(Vatke) Agnew
Salvia aegyptiaca L.
Salvia deserti Decne.
Salvia lanigera Poir.
Salvia merjamie Forssk.
Salvia sp. aff. merjamie Forssk.
Salvia schimperii Benth.
Salvia spinosa L.
Salvia sp. nov.
Scutellaria arabica Jaub. & Spach
Scutellaria peregrina L.
Stachys aegyptiaca Pers.
Stachys sp. aff. aegyptiaca Pers.
Stachys sp. nov. aff. schimperii Vatke
Teucrium oliverianum Ging. ex Benth.
Teucrium polium L.

Teucrium polium L. agg. 2390
Teucrium yemense DeFl.
Teucrium sp. nov.
Thuspeinanta persica (Bois) Briq.

LAURACEAE

Cassytha filiformis L.

LEGUMINOSAE

Abrus bottae DeFl.
Acacia abyssinica Hochst. ex Benth.
 var. *macroloba* Schweinf.
Acacia albida Del.
Acacia asak (Forssk.) Willd.
Acacia ehrenbergiana Hayne
Acacia elatior Brenan ssp. *elatior*
Acacia etbaica Schweinf.
Acacia etbaica Schweinf. ssp.
uncinata Brenan
Acacia iraquensis Rech. f.
Acacia hamulosa Benth.
Acacia laeta R.Br. ex Benth.
Acacia mellifera (Vahl) Benth.
Acacia negrii Pichi-Sermolli
Acacia nubica Benth.
Acacia seyal Del.
Acacia tortilis (Forssk.) Hayne
Acacia tortilis (Forssk.) Hayne ssp.
raddiana (Savi) Brenan
Alhagi maurorum Medic.
Anagyris foetida L.
Argyrolobium arabicum (Decne.)
 Jaub. & Spach
Argyrolobium sp. aff. *arabicum*
 (Decne.) Jaub. & Spach
Argyrolobium confertum Polhill
Argyrolobium sp. aff. *crotalarioides*
 Jaub. & Spach
Astragalus abyssinicus Steud.
Astragalus annularis Forssk.
Astragalus atropilosus
 (Hochst.) Bunge
Astragalus bombycinus Benth.
Astragalus caprinus L. var. *laniger*
 (Desf.) Maire
Astragalus corrugatus Bert.
Astragalus eremophilus Boiss.
Astragalus fatimensis
 Hochst. ex Chiov.
Astragalus hauarensis Benth.
Astragalus kahiricus DC.
Astragalus palaestinus Eig
Astragalus schimperi Boiss.
Astragalus sieberi DC.
Astragalus sparsus Decne.
Astragalus spinosus (Forssk.) Muschl.
Astragalus traconiticus Post
Astragalus tribuloides Del. sensu lato
Astragalus tribuloides Del. var.
minutus (Boiss.) Boiss.
Astragalus sp. aff. *tribuloides* Del. var.
tribuloides
Astragalus sp. aff. *tribuloides* Del.
Astragalus vogelii (Webb) Bornm.
Astragalus sp. (section *Rhacophorus*)
Astragalus sp. 1000
Astragalus sp. 2408
Astragalus sp. 1811
Astragalus sp. 1826
Astragalus sp. 3426
Biserrula pectinatus L.

283 *Cadia purpurea* (Picciv.) Ait.
 283 *Cassia holosericea* Fres.
 283 *Cassia italica* (Mill.) Lam. ex Steud.
 284 *Cassia occidentalis* L.
Cassia senna L.
Cassia tora L.
Cicer cuneatum Hochst. ex Rich.
Clitoria ternatea L.
 284 *Colutea istria* Mill.
Crotalaria aegyptiaca Benth.
Crotalaria emarginella Vatke
Crotalaria leptocarpa Balf. f.
Crotalaria microphylla Vahl
Crotalaria quartiniana A. Rich.
 285 *Crotalaria senegalensis* (Pers.)
 Bacle ex DC.
 285 *Crotalaria* sp. nov.
 286 *Cyamopsis senegalensis* Guill. & Perr.
 286 *Delonix elata* (L.) Gamble
 287 *Desmodium gangeticum* (L.) DC.
 287 *Dichrostachys cinerea* (L.) DC.
 287 Wight & Arn.
Dolichos trilobus L.
 288 *Glycine wightii* (Wight & Arn.)
 Verdc. ssp. *longicauda*
 (Schweinf.) Verdc.
 289 *Hippocrepis bicontorta* Lois.
 289 *Hippocrepis ciliata* Willd.
 289 *Hippocrepis* sp. aff. *ciliata* Willd.
 290 *Hippocrepis constricta* Kunze
 290 *Hippocrepis unisiliquosa* L.
 291 *Indigofera arabica* Jaub. & Spach
Indigofera articulata Gouan
 291 *Indigofera caerulea* Roxb.
 291 var. *caerulea*
 291 *Indigofera colutea* (Burm. f.) Merrill
Indigofera disjuncta Gillett
 292 *Indigofera hochstetteri* Bak.
Indigofera linifolia (L.f.) Retz.
 292 *Indigofera oblongifolia* Forssk.
 292 *Indigofera phillipsiae* Bak. f.
Indigofera schimperi Jaub. & Spach
 292 *Indigofera semitrijuga* Forssk.
 293 *Indigofera sessiliflora* DC.
 293 *Indigofera spiniflora*
 Hochst. & Steud ex Boiss.
 293 *Indigofera spinosa* Forssk.
 293 *Indigofera* ? *trita* L.f.
Indigofera sp. aff. *trita* L.f.
 294 *Indigofera tritoides* Bak.
 294 *Indigofera* sp. aff. *volkensii* Taub.
 294 *Indigofera* sp. 3234
Lablab purpurea (L.) Sweet
 294 *Lathyrus aphaca* L.
 295 *Lathyrus cicera* L.
 295 *Lathyrus pratensis* L.
 296 *Lathyrus saxatilis* (Vent.) Vis.
 296 *Lens orientalis* (Boiss.) Hand.-Mazz.
 296 *Lotononis platycarpus*
 (Viv.) Pic.-Serm.
 297 *Lotus* sp. aff. *arabicus* L.
 298 *Lotus corniculatus* L.
 298 *Lotus corniculatus* L. var.
eremanthus Chiov.
 298 *Lotus halophilus* Boiss. & Sprun.
Lotus lanuginosus Vent.
 299 *Lotus* sp. aff. *quinatus* (Forssk.) Gillett
 299 *Lotus schimperi* Steud. ex Boiss.
 299 *Macrotyloma axillare* (E. Mey.) Verdc.
 300 var. *axillare*
 300 *Medicago laciniata* (L.) Mill.
 300 *Medicago laciniata* (L.) Mill. var.
brachycantha Boiss.
 300 *Medicago lupulina* L.
 301 *Medicago minima* (L.) Bart.
 301 *Medicago orbicularis* (L.) Bart.

301 *Medicago polymorpha* L.
 302 *Melilotus alba* Medic.
 302 *Melilotus indica* (L.) All.
 302 *Onobrychis ptolemaica* (Del.) DC.
 303 *Ononis natrix* L. sensu lato
 303 *Ononis reclinata* L.
 303 *Ononis sicula* Guss.
 303 *Pisum sativum* L. var.? *arvense*
 (L.) Poiret
 304 *Prosopis farcta* (Banks & Sol.) Macbr.
 304 *Prosopis juliflora* DC.
 304 *Psoralea plicata* Del.
 305 *Retama raetam* (Forssk.)
 Webb & Berth.
 305 *Rhynchosia buramensis*
 Hutch. & Bruce
 305 *Rhynchosia malacophylla*
 (Spreng.) Boj.
 306 *Rhynchosia malacophylla*
 (Spreng.) Boj. *vergens* ad R.
minima (L.) DC.
 306 *Rhynchosia memnonia* (Del.) DC.
 307 *Rhynchosia minima* (L.) DC.
 var. *minima*
 307 *Rhynchosia* sp. aff. *minima* (L.) DC.
 307 *Rhynchosia pulverulenta* Stocks
 308 *Rhynchosia* sp. aff. *schimperi* Boiss.
 308 *Rhynchosia totta* (Thunb.) DC.
 308 *Rhynchosia* sp. aff.
usambarensis Taub.
 309 *Rhynchosia* sp. nov.
 309 *Sesbania sesban* (L.) Merrill
 309 *Stylosanthes fruticosa* (Retz.) Alston
Tamarindus indica L.
 309 *Taverniera aegyptiaca* Boiss.
 310 *Taverniera lappacea* DC.
 310 *Tephrosia apollinea* (Del.) Link
 310 *Tephrosia desertorum* Scheele
 310 *Tephrosia nubicum* (Boiss.) Bak.
 311 *Tephrosia pumila* (Lam.) Pers.
 311 *Tephrosia purpurea* (L.) Pers.
 311 *Tephrosia purpurea* (L.) Pers. ssp.
leptostachya (DC.) Brummitt
 312 var. *leptostachya*
Tephrosia purpurea (L.) Pers. ssp.
leptostachya (DC.) Brummitt
 312 var. *pubescens* (Bak.) Brummitt
 312 *Tephrosia quartiniana* Cuf.
 313 *Tephrosia* sp. aff. *quartiniana* Cuf.
 313 *Tephrosia subtriflora* Hochst. ex Bak.
 313 *Tephrosia uniflora* Pers. ssp.
petrosa Gillett & Ali
 314 *Teramnus labialis* (L.f.) Spreng. ssp.
arabicus Verdc.
 314 *Teramnus repens* (Taub.) Bak. ssp.
gracilis (Chiov.) Verdc.
 315 *Trifolium arvense* L.
 315 *Trifolium campestre* Schreb.
 316 *Trifolium fragiferum* L.
 315 *Trifolium tomentosum* L.
 315 *Trigonella anguina* Del.
 316 *Trigonella hamosa* L.
Trigonella hamosa ssp. *uncata*
 (Boiss. & Noe) C.C.T.
 316 *Trigonella stellata* Forssk.
 316 *Vermifruax abyssinica* (A. Rich.) Gillett
 317 *Vicia sativa* L.
 317 *Vicia sativa* L. var. *angustifolia* L.
Vicia sativa L. ssp. *nigra* (L.)
 Ehrh. var. *nigra*
 318 *Vigna aconitifolia* (Jacq.) Marechal
 318 *Vigna ambacensis* Welw. ex Bak.
 318 *Vigna membranacea* A. Rich.

LEMNACEAE

Lemna gibba L. 335

LILIACEAE

Albuca abyssinica Dryand. 336
Allium sp. aff. ampeloprasum L. 336
Allium pseudocalyptratum Mouterde 337
Allium sp. aff. rothii Zucc. 337
Allium sinaiticum Boiss. 337
Allium sindjarens (Boiss.)
Boiss. & Hausskn. ex Regel 337
Allium stamineum Boiss. 338
Allium sp. 2504 338
Aloe castellorum J. R. I. Wood 339
Aloe fleurentinorum Lavr. 339
Aloe sp. aff. niebuhriana Lavr. 339
Aloe rubroviolacea Schweinf. 340
Aloe sabaea Schweinf. 340
Aloe sp. aff. scobinifolia
G. Reyn. & Bally 341
Aloe sheilae Lavr. 341
Aloe sp. aff. tomentosa Deffl. 342
Aloe vacillans Forssk. 342
Aloe sp. nov. aff. vacillans Forssk. 343
Aloe vera (L.) Burm. f. var.
officinalis Forssk. 343
Aloe sp. nov. (Radwa) 2219 344
Aloe sp. (sp. 'C.' of J. R. I. Wood) 3525 344
Aloe sp. (Shafa) 3738 345
Aloe sp. 4329 345
Asparagus africanus Lam. 346
Asparagus aphyllus L. var. stipularis
(Forssk.) Bak. 346
Asparagus falcatus L. 346
Asparagus flagellaris (Kunth.) Bak. 346
Asphodelus sp. aff. aestivus Brot. 347
Asphodelus fistulosus L. 347
Asphodelus refractus Boiss. 348
Bellevallia flexuosa Boiss. 348
Colchicum sp. aff. ritchii R. Br. 348
Dipcadi serotinum (L.) Medik. 349
Dipcadi viride (L.) Moench. 349
Drimia maritima (L.) Stearn 349
Gagea reticulata (Pallas)
Schultes & Schultes f. 350
Merendera abyssinica A. Rich. 350
Tulipa biflora Pallas 351

Tapinanthus globiferus
(A. Rich.) Tiegh 355
Viscum schimperii Engl. 355

LYTHRACEAE

Ammannia auriculata Willd. 356
Ammannia baccifera L. 356
Lawsonia inermis L. 356
Lythrum hyssopifolia L. 357
Woodfordia fruticosa (L.) S. Kurz 357

MALVACEAE

Abutilon bidentatum 357
Hochst. ex A. Rich. 357
Abutilon sp. aff. bidentatum
Hochst. ex A. Rich. 1149 358
Abutilon sp. aff. bidentatum
Hochst. ex A. Rich. 1471 358
Abutilon sp. aff. bidentatum
Hochst. ex A. Rich. 1486 359
Abutilon figarianum Webb 358
Abutilon fruticosum Guill. & Perr. 359
Abutilon muticum (Del.) Webb 359
Althaea ludwigii L. 360
Cienfuegosia welshii
(T. Anders.) Garcke 360
Gossypium hirsutum L. var.
punctatum (Schum. & Thonn.) Hutch. 360
Hibiscus sp. aff. aponeurus
Sprague & Hutch. 360
Hibiscus deflersii Schweinf. 360
Hibiscus micranthus L. f. 361
Hibiscus somalensis Franch. 361
Hibiscus trionum L. 361
Hibiscus vitifolius L. 361
Kosteletzkyia sp. ? nov. 362
Malva neglecta Wallr. 362
Malva parviflora L. 363
Malva verticillata L. 362
Pavonia arabica Hochst. 363
Pavonia kotschyii Hochst. 363
Pavonia patens (Andr.) Chiov. 364
Pavonia triloba Hochst. 364
Senra incana Cav. 365
Sida ovata Forssk. 365
Sida spinosa L. 365

MELIACEAE

Trichilia emetica Vahl 366

MENISPERMACEAE

Cocculus hirsutus (L.) Diels. 366
Cocculus pendulus
(J. R. & G. Forst.) Diels. 367

MORACEAE

Dorstenia foetida (Forssk.)
Schweinf. & Engl. 367
Ficus carica L. 368
Ficus carica L. forma
Ficus sp. aff. glumosa Del. var.
glaberrima Martelli 368
Ficus ingens (Miq.) Miq. 369
Ficus populifolia Vahl 369

Ficus salicifolia Vahl 369
Ficus sycomorus L. 370
Ficus vasta Forssk. 370

MORINGACEAE

Moringa peregrina (Forssk.) Fiori 371

MYRICACEAE

Myrica salicifolia Hochst ex A. Rich. 372

MYRSINACEAE

Maesa lanceolata Forssk. 373
Myrsine africana L. 373

MYRTACEAE

Myrtus communis L. 374

NYCTAGINACEAE

Boerhavia coccinea Mill. var. viscosa
(Lag. & Rodr.) R. M. Mosc. 374
Boerhavia elegans Choisy 375
Boerhavia repens L. 375
Commicarpus grandiflorus
(A. Rich.) Standl. 375
Commicarpus helenae
(J. A. Schultes) Meikle 376
Commicarpus plumbagineus
(Car.) Standl. 376
Commicarpus sinuatus Meikle 376
Commicarpus squarrosus
(Heimerl) Standl. 376

OCHNACEAE

Ochna inermis (Forssk.) Schweinf. 377

OLEACEAE

Jasminum grandiflorum L. var.
floribundum (R. Br. ex Fresen.)
P. S. Green 378
Olea europaea L. ssp. africana
(Burm. f.) P. S. Green 378

ONAGRACEAE

Epilobium hirsutum L. 379

OPHIOGLOSSACEAE

Ophioglossum polyphyllum A. Br. 380

ORCHIDACEAE

Eulophia petersii (Rchb. f.) Rchb. f. 381
Holothrix arachnoidea Rchb. f. 380

LINACEAE

Linum corymbulosum Reichenb. 352
Linum trigynum L. 352

LOGANIACEAE

Buddleja polystachya Fres. 352
Nuxia oppositifolia Hochst. 353

LORANTHACEAE

Oncocalyx schimperii
(Hochst. ex A. Rich.) M. Gilbert 353
Phragmanthera sp. aff. rufescens
(DC.) Balle 354
Platosepalus acaciae
(Zucc.) Wiens & Polhill 354
Platosepalus curviflorus
(Benth. ex Oliv.) Tiegh 354

OROBANCHACEAE

Cistanche phelypaea (L.) Cout.	382
Cistanche tubulosa (Schenk.)	
R. Wight forma albiflora Gilli	382
Cistanche violacea (Desf.) G. Beck	383
Orobanche aegyptiaca Pers.	383
Orobanche caucasica Beck.	383
Orobanche cernua Loeffl. var. cernua	384
Orobanche cernua Loeffl. var.	
desertorum Beck	384
Orobanche cernua var.	
latebracteata Beck	384
Orobanche minor Sm.	385
Orobanche mutellii F. Schultz var.	
angustiflora Beck	385
Orobanche oxyloba (Reuter) Beck	
var. oxyloba	385
Orobanche ramosa L.	385

OXALIDACEAE

Oxalis corniculata L.	386
-----------------------	-----

PALMAE

Hyphaene thebaica (L.) Mart.	386
Phoenix caespitosa Chiov.	387
Phoenix dactylifera L.	387

PANDANACEAE

Pandanus odoratissimus L.	388
---------------------------	-----

PAPAVERACEAE

Argemone mexicana L.	388
Argemone ochroleuca Sweet	389
Fumaria parviflora Lam.	389
Glaucium arabicum Fres.	389
Hypocoum cf. geslinii Coss. & Kral	389
Hypocoum pendulum L.	390
Papaver dubium L. sensu lato	390
Papaver dubium L. var. laevigatum	
(M. Bieb.) Elkan	390
Papaver glaucum Boiss.	391
Papaver sp.	391
Roemeria hybrida (L.) DC.	392

PASSIFLORACEAE

Adenia venenata Forssk.	392
-------------------------	-----

PEDALIACEAE

Sesamum indicum L.	393
--------------------	-----

PLANTAGINACEAE

Plantago afra L.	393
Plantago albicans L.	394
Plantago amplexicaulis Cav.	394
Plantago ciliata Desf.	394
Plantago coronopus L.	394
Plantago cylindrica Forssk.	395

Plantago lanceolata L.	395
Plantago major L.	395
Plantago ovata Forssk.	395

PLUMBAGINACEAE

Limonium axillare (Forssk.) O. Kuntze	396
Limonium cylindrifolium	
(Forssk.) Verdc.	396
Limonium thouini (Viv.) O. Kuntze	397
Plumbago zeylanica L.	397

POLYGALACEAE

Polygala abyssinica R.Br.	398
Polygala sp. aff. abyssinica R.Br.	399
Polygala erioptera DC.	399
Polygala irregularis Boiss.	398
Polygala senensis Klotzsch	399
Polygala sinaica Botsch.	400
Polygala subaphylla Swartz	400
Polygala tinctoria Vahl	400
Polygala sp. 5155	400

POLYGONACEAE

Atraphaxis spinosa L.	401
Calligonum crinitum Boiss.	
ssp. arabicum (Sosk.) Sosk.	401
Calligonum polygonoides L. ssp.	
comosum (L'Her.) Sosk.	402
Emex spinosus (L.) Campd.	402
Oxygonum sinuatum (Meissn.) Dam.	402
Polygonum amphibium L.	402
Polygonum aviculare L.	403
Polygonum patulum M. Bieb.	403
Polygonum setulosum A. Rich.	403
Rheum sp. aff. vives L.	403
Rumex conglomeratus Murr	404
Rumex nervosus Vahl	404
Rumex pictus Forssk.	404
Rumex steudelii Hochst.	405
Rumex vesicarius L.	405

POLYPODIACEAE

Actiniopteris semiflabellata Pic. -Ser.	406
Adiantum capillus-veneris L.	406
Adiantum incisum Forssk.	407
Anogramma leptophylla (L.) Link	407
Asplenium aethiopicum	
(Burm.) Bech.	407
Asplenium trichomanes L.	407
Ceterach officinarum DC.	408
Cheilanthes coriacea Decne.	408
Cheilanthes marantae (L.) Domin	408
Cheilanthes pteridioides	
(Reichard) C. Chr.	409
Cheilanthes vellea (Ait.) F. Mueller	409
Onychium melanolepis (Decne.)	
O. Kuntze	409
Pteris dentata Forssk. ssp. dentata	409
Pteris vittata L.	410

PORTULACACEAE

Portulaca oleracea L.	411
Portulaca quadrifida L.	411
Talinum cuneifolium (Vahl) Willd.	411

POTAMOGETONACEAE

Potamogeton nodosus Poir.	412
Potamogeton pectinatus L.	412
Potamogeton pusillus L.	413

PRIMULACEAE

Anagallis arvensis L. ssp. arvensis	413
Anagallis arvensis L. ssp. foemina	
(Mill.) Schinz & Thell.	413
Anagallis sp. nov.	414
Androsace maxima L.	414
Primula verticillata Forssk.	414
Samolus valerandi L.	414

RANUNCULACEAE

Adonis dentata Del.	415
Clematis incisodentata A. Rich.	416
Clematis simensis Fresen.	416
Delphinium sheilae Kit Tan	417
Ranunculus multifidus Forssk.	417
Ranunculus muricatus L.	417
Ranunculus trichophyllus Chaix	417

RESEDACEAE

Caylusea hexagyna	
(Forssk.) M.L. Green	418
Ochradenus baccatus Del.	418
Oligomeris linifolia (Vahl) Macbride	419
Reseda arabica Boiss.	419
Reseda decursiva Forssk.	419
Reseda muricata Presl	420
Reseda sphenocleoides Deffl.	420
Reseda sp.	420

RHAMNACEAE

Berchemia discolor (Klotzsch) Hemsl.	421
Rhamnus disperma Ehrenb. ex Boiss.	421
Rhamnus oleoides L.	421
Sageretia thea (Osb.) M.C. Johnst.	422
Sageretia thea (Osb.) M.C. Johnst. var.	
bornmuelleri (Schneid.) M.C. Johnst.	422
Ziziphus nummularia	
(Burm. f.) Wight & Arn.	422
Ziziphus spina-christi (L.) Willd.	423
Ziziphus spina-christi (L.) Willd. var.	
inermis Boiss.	423

RHIZOPHORACEAE

Rhizophora mucronata Lam.	424
---------------------------	-----

ROSACEAE

Alchemilla cryptantha Steud.	424
Amygdalus arabica Oliv.	425
Cotoneaster racemiflora C. Koch	425
Crataegus sinaica Boiss.	426
Neurada procumbens L.	426
Potentilla hispanica Zimm.	426
Prunus cf. microcarpa C.A. Meyer	427
Rosa abyssinica R.Br.	427

Rubus cf. canescens DC.	427
Rubus sanctus Schreb.	427

RUBIACEAE

Callipeltis aperta Boiss. & Buhse	428
Callipeltis cucullaria (L.) Rothm.	428
Canthium phyllanthoideum Baill.	428
Canthium schimperianum Rich.	429
Crucianella ciliata Lam.	429
Crucianella membranacea L.	429
Galium aparine L.	429
Galium aparinoides Forssk.	430
Galium ceratopodium Boiss.	430
Galium kahelianum Deffl.	430
Galium setaceum Lam. ssp. decaisnei (Boiss.) Ehrend.	430
Galium spurium L. var. africanum Verdc.	431
Galium tricornutum Dandy	431
Galium yemense Kotschy	431
Galium yemense Kotschy sensu lato	431
Galium sp. 2892	432
Galium sp. 3375	432
Kohautia caespitosa Schnitzl.	432
Oldenlandia capensis L.f. var. capensis	433
Pavetta longiflora Vahl	433
Pavetta ? pammalaka Bremek.	433
Pentas lanceolata (Forssk.) K. Schum.	434
Pterogaillonia calycoptera (Decne.) Lincz.	434
Sherardia arvensis L.	434
Valantia hispida L.	434

RUTACEAE

Haplophyllum tuberculatum (Forssk.) A. Juss.	435
Ruta chalepensis L.	435
Teclea nobilis Del.	435

SALICACEAE

Salix subserrata Willd.	436
-------------------------	-----

SALVADORACEAE

Dobera glabra (Forssk.) Poir.	437
Salvadora persica L.	437

SANTALACEAE

Osyris abyssinica Hochst. ex Steud.	438
-------------------------------------	-----

SAPINDACEAE

Allophylus rubifolius (Hochst.) Engler	439
Dodonaea viscosa L.	438, 439

SAPOTACEAE

Mimusops laurifolia (Forssk.) Friis	440
Monothea buxifolia (Falconer) A.D.C. in DC.	441

SCROPHULARIACEAE

Alectra parasitica Hochst. ex A. Rich.	442
Anarrhinum orientale Benth.	442
Anticharis arabica Endl.	443
Anticharis glandulosa Asch.	443
Anticharis linearis (Benth.) Asch.	443
Aptosimum pumilum (Hochst.) Benth.	444
Bacopa monnieri (L.) Pennell	444
Campylanthus pungens Swartz	444
Chascanum marrubifolium Fenzl ex Walp.	444
Craterostigma pumilum Hochst.	444
Kickxia abhensis D. Sutton ined.	445
Kickxia acerbiana (Boiss.) V.A.W. Smith	445
Kickxia aegyptiaca (Dum.) Nab.	445
Kickxia coralii D. Sutton ined.	445
Kickxia elatine (L.) Dum. ssp. crinita (Mabille) W. Greuter	446
Kickxia hastata (R.Br. ex Benth.) Dandy	446
Kickxia sp. aff. petiolata D. Sutton	446
Kickxia pseudoscopia D. Sutton ined.	447
Kickxia sp. nov. 3311	446
Kickxia sp. nov. 4389	447
Linaria chalepensis (L.) Mill.	448
Linaria haelava (Forssk.) Del.	448
Linaria sp. aff. haelava (Forssk.) Del.	448
Linaria simplex (Willd.) DC.	449
Linaria sp. aff. tenuis (Viv.) Sprengel	449
Lindenbergia indica (L.) Kuntze	449
Lindenbergia indica (L.) Kuntze sensu lato (sp. A.)	450
Lindenbergia indica (L.) Kuntze sensu lato (sp. B.)	450
Lindenbergia sinaica (Decne.) Benth.	450
Misopates orontium (L.) Rafin	450
Schweinfurthia pterosperma A. Braun	451
Scoparia dulcis L.	451
Scrophularia arguta Soland. ex Ait.	451
Scrophularia deserti Del.	452
Scrophularia hypericifolia Wydl.	452
Striga asiatica (L.) Kuntze	453
Striga gesnerioides (Willd.) Vatke ex Engl.	453
Striga hermonthica (Del.) Benth.	453
Verbascum bottae Deffl.	454
Verbascum decaisneanum O. Kuntze	454
Verbascum longibracteatum Deffl.	454
Verbascum melhanense (Murb.) Hub.-Mor.	455
Verbascum nubicum Murb.	455
Verbascum schimperianum Boiss.	455
Verbascum sinaiticum Benth.	456
Verbascum yemense Deffl.	456
Verbascum sp. nov.	456
Verbascum sp.	457
Veronica anagallis-aquatica L.	457
Veronica beccabunga L.	457
Veronica cymbalaria Bodard	458
Veronica opaca Fries.	458

SELAGINELLACEAE

Selaginella imbricata (Forssk.) Spring	458
Selaginella yemensis Spring	458

SOLANACEAE

Datura fastuosa L.	459
Datura innoxia Mill.	460
Datura stramonium L.	460
Hyoscyamus albus L.	460
Hyoscyamus cf. aureus L.	461
Hyoscyamus desertorum (Asch. ex Boiss.) Tackholm	461
Hyoscyamus muticus L.	461
Hyoscyamus pusillus L.	462
Hyoscyamus sp.	462
Lycium sp. nov. aff. depressum Stocks	463
Lycium sp. aff. depressum Stocks	463
Lycium shawii Roem. & Schult.	463
Solanum albicaule Dun.	464
Solanum coagulans Forssk.	464
Solanum grossedentatum A. Rich.	464
Solanum incanum L.	464
Solanum macracanthum A. Rich.	465
Solanum schimperianum Hochst. ex A. Rich.	465
Solanum sepicula Dun.	465
Solanum surratense Burm. f.	466
Solanum villosum Lam.	466
Solanum villosum (L.) Lam. ssp. puniceum (Kirsch.) Edmonds	466
Solanum sp. aff. villosum (L.) Lam.	467
Solanum sp.	467
Withania somnifera (L.) Dun.	467

STERCULIACEAE

Glossostemon bruguieri DC.	468
Melhanie incana Heyne	468
Melhanie near muricata Balf. f.	468
Melhanie ovata (Cav.) Spreng.	469
Melhanie philippsiae Bak. f.	469
Melhanie velutina Forssk.	469
Waltheria indica L.	469

TAMARICACEAE

Reumuria hirtella Jaub. & Spach	470
Tamarix aphylla (L.) Karst.	470
Tamarix aucheriana (Decne.) Baum	471
Tamarix arabica Bunge	471
Tamarix macrocarpa (Ehrenb.) Bunge	472
Tamarix szovitsiana Bunge	472

THYMELACEAE

Daphne linearifolia Hart	473
Daphne mucronata Royle	473
Gnidia somalensis (Franch.) Gilg	473

TILIACEAE

Corchorus antichorus (L.) Raeusch.	474
Corchorus olitorius L.	474
Corchorus trilocularis L.	474
Grewia erythraea Schweinf.	475
Grewia sp. aff. erythraea Schweinf.	475
Grewia mollis Juss.	475
Grewia tembensis Fresen.	476
Grewia tenax (Forssk.) Fiori	476
Grewia velutina Vahl	476

Grewia villosa Willd.	476	Pimpinella sp.	487	<div>VITACEAE</div>	
Grewia sp. (Wadi al Uss) 2104	477	Pituranthos triradiatus	477		
Grewia sp. (Hadda) 3220	477	(Hochst.) Asch. & Schweinf.	488		
Grewia sp. (Fayfa) 3273	477	Pycnocycla glauca Lindl.	488	Cissus quadrangularis L.	498
Triumfetta flavescens Hochst.		Pycnocycla tomentosa Decne.	488	Cissus rotundifolius (Forssk.) Vahl	498
ex A. Rich.	477	Pycnocycla sp. (sp. C)	488	Cyphostemma digitatum (Forssk.)	
Triumfetta heterocarpa		Scandix pecten-veneris L.	489	Descoings	498
Sprague & Hutch.	478	Torilis arvensis (Huds.) Link	489	Roicissus revouilii Planchon	499
Triumfetta rhomboidea Jacq.	478	Torilis nodosa (L.) Gaertn.	489		
Triumfetta sp. aff. rhomboidea Jacq.	478	Trachyspermum ammi (L.) Sprague	490	<div>ZANNICHELLIACEAE</div>	
		Zosima absinthifolia (Vent) DC.	490		
<div>TYPHACEAE</div>		<div>URTICACEAE</div>		Zannichellia palustris L. var.	
Typha domingensis Pers.	479			genuina Asch.	499
Typha elephantina Roxb.	479	Forskoalea tenacissima L.	490		
		Forskoalea viridis Ehrenb.	491	<div>ZYGOPHYLLACEAE</div>	
<div>ULMACEAE</div>		Parietaria alsinifolia Del.	491		
		Parietaria debilis Forst.	491	Balanites aegyptiaca Del.	500
		Parietaria lusitanica L. forma	491	Fagonia bruguieri DC.	500
		Urtica pilulifera L.	492	Fagonia glutinosa Del.	501
Celtis africana Burm. f.	480	Urtica urens L.	492	Fagonia indica Burm. f.	501
				Fagonia paulayana Vierh.	501
				Fagonia schweinfurthii Hadidi	501
				Fagonia tenuifolia Hochst. & Steud.	
				ex Boiss.	502
				Fagonia tristris Sickenb. var.	
				boveana Hadidi	503
				Nitraria retusa (Forssk.) Asch.	502
				Peganum harmala L.	503
				Seetzenia lanata (Willd.) Bullock	502
				Tribulus arabicus H. Hosni ined.	504
				Tribulus bimucronatus Viv.	504
				Tribulus kaiseri H. Hosni ined.	505
				Tribulus macropterus Boiss.	505
				Tribulus parvispinus Presl.	505
				Tribulus pentandrus Forssk.	505
				Tribulus terrestris L. var.	
				terrestris	506
				Tribulus terrestris L. var.	
				robustus Boiss.	506
				Zygophyllum album L. f.	506
				Zygophyllum coccineum L.	506
				Zygophyllum decumbens Del.	507
				Zygophyllum hamiense Schweinf.	507
				Zygophyllum simplex L.	507
				Note: Sauromatum venosum has been incorrectly identified for Arisaema flavum (Forssk.) Schott.	
				<div>VALERIANACEAE</div>	
Ammi majus L.	481	Valerianella dufresnia Bunge ex Boiss.	493		
Anisosciadium lanatum Boiss.	481	Valerianella muricata (Stev.) Baxt.	493		
Apium graveolens (L.) Lag.	481	Valerianella oxyrrhyncha			
Apium nodiflorum (L.) Lag.	482	Fisch. & Mey.	492		
Bifora testiculata (L.) Roth.	482	Valerianella szovitsiana Fisch. & Mey.	493		
Bupleurum gerardii All.	482				
Centella asiatica (L.) Urb.	482				
Conium maculatum L.	483				
Ducrosia anethifolia (DC.) Boiss.	483				
Ducrosia flabellifolia Boiss.	483				
Eryngium glomeratum Lam.	484				
Ferula communis L.	484				
Ferula communis L. ssp. glauca					
(L.) Rouy & Camus	485				
Ferula ovina Boiss.	485				
Ferula rutbaensis C.C. Townsend	485				
Foeniculum vulgare Mill.	486				
Oreoschimperella arabiae-felicis					
C.C. Townsend var.					
laevis C.C. Townsend	486				
Pimpinella cretica Poir. var.					
arabica Boiss.	486				
Pimpinella eriocarpa					
Banks & Solander	486				
Pimpinella sp. aff. eriocarpa					
Banks & Solander	486				
Pimpinella sp. aff. hirtella					
(Hochst.) Rich.	487				
Pimpinella cf. schweinfurthii Asch.	487				



INTRODUCTION

This book is a record of a personal collection, and it is intended to be both a field guide for the enthusiastic amateur and a systematic listing for the professional.

I first visited Saudi Arabia in 1972. I had previously made substantial botanical collections for the British Museum of Natural History and the Royal Botanical Gardens Kew, over a period of ten years or more, while I was living in Borneo. My initial expectations were that Saudi Arabia would be an area poor in species after the luxuriant jungles of the Far East, and consequently my botanical activities were at first subordinated to the pedigree herd of Charollais cattle I was building up in Britain, and to the study of marine shells while in Saudi Arabia.

However, my botanical work over the first three or four years convinced me that the flora of Saudi Arabia, particularly western Saudi Arabia, was not only much richer than I had expected, but it was one of those places in the world which had not yet been studied extensively. In 1977 I started to supplement my collections with photographs of specimens as I collected them. At first I used very simple equipment, but as I gained experience, I developed a standard technique, using a Vivitar macro lens, offset flash, and Kodachrome or Ektachrome 64 film.

By 1980 I had a somewhat haphazard accumulation of almost 1000 photographs of named species, and it was at this time that I was persuaded to consider preparing the photographs and supporting data in a form suitable for publication. During the past five years, this task has been my major interest, extending the collection and taking better photographs of the earlier specimens.

Circumstances have dictated that fieldwork has been mainly in the western part of the Kingdom, where I was able to make use of the transport and camp facilities of the exploration teams of the Deputy Ministry of Mineral Resources for much of my work. I have not travelled east of Riyadh, but I suspect that the subdued topography of the eastern part of the Kingdom supports fewer species than the more varied topography of the west. This is supported by an examination of records from the Gulf area, which also reveals relatively few species that I have not found in the west.

This book is not intended in any way to be a flora of the Kingdom. A flora and revised flora has already been published by Professor Migahid, of Riyadh University, and a more far ranging flora of the entire Arabian Peninsula is presently in preparation by specialists at the Royal Botanic Gardens of Kew and Edinburgh. Any particular merit that this book may have, lies largely in the fact that every species listed is substantiated by a numbered specimen in at least one herbarium, and that the majority of the illustrations are of the actual specimens collected. Where better photographs, taken later, have been used, I have been satisfied that the specimens photographed subsequently were identical to the originals.

Initially dried specimens were sent only to the Royal Botanic Gardens, Kew, but subsequently duplicates were lodged with the Royal Botanic Gardens, Edinburgh. Since 1983 a third set has been given to the Ministry of Agriculture in Riyadh, for retention in their National Herbarium. The numbers given in the Index of Species (pp. 509-516) correspond to the numbers under which the specimens are filed in these three herbaria.

All identifications in this book have been made by members of the staffs of the Royal Botanic Gardens at Kew and Edinburgh, or exceptionally by specialists in certain families at other centres. Although every effort has been taken to ensure accuracy in naming, certain species have proved difficult to match with existing material or are in groups in need of revision. Where this is so, the generic name is followed by the abbreviation 'sp.', or if the plant differs only slightly from a species, the terms 'sensu lato' or 'sp. aff.' are used.

Altitudes are given in feet. Although this is not official Saudi usage, all altitude readings are based on aircraft altimeter or pilotage charts where the use of feet remains the international standard. To convert to metres, multiply by 0.3048.





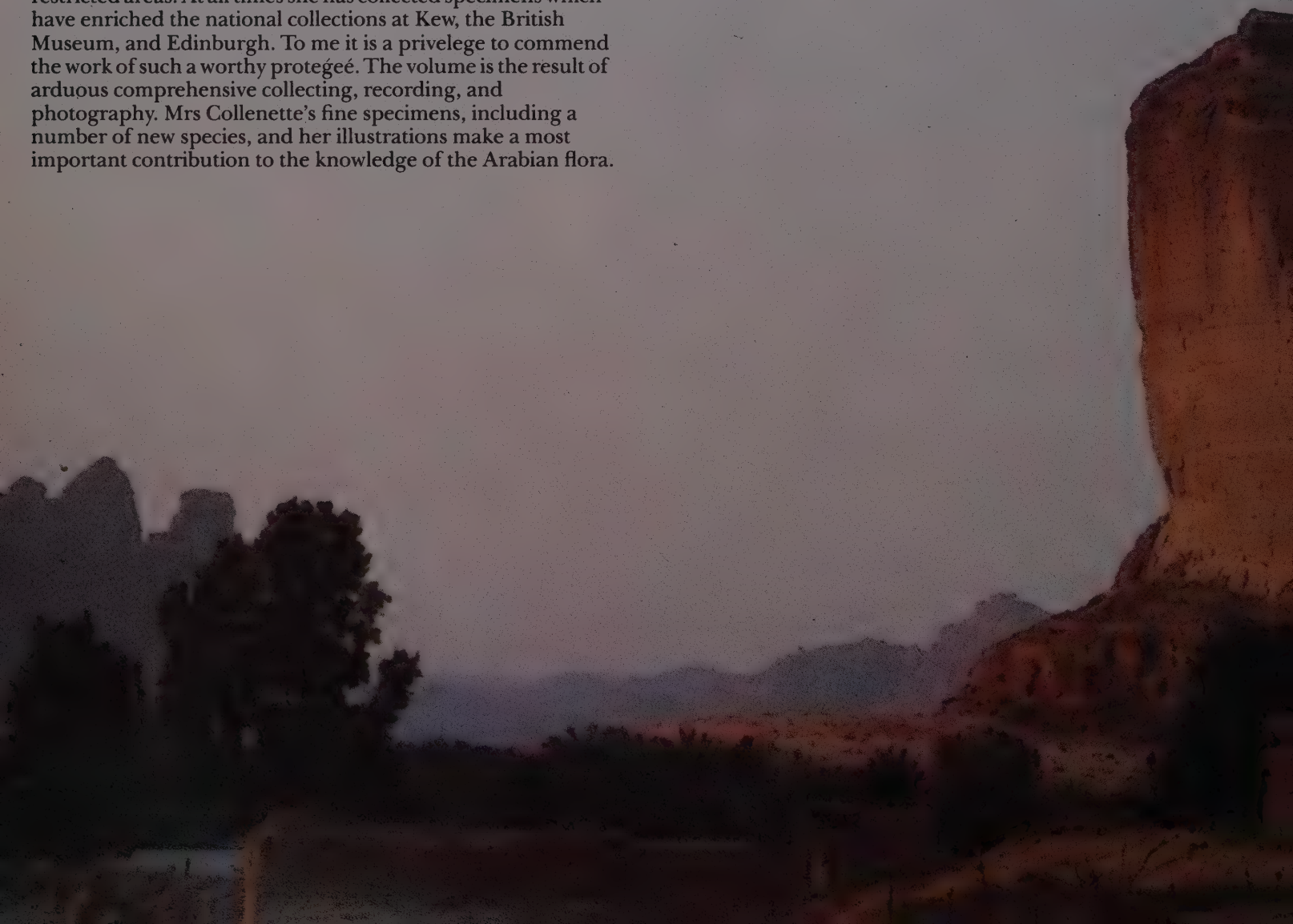
FOREWORD

The content of this beautiful book will surely come as a revelation to most people whose prevailing image of Saudi Arabia is that of a country almost devoid of vegetation and one of barren waste land. *Deserta* is the usual evocative and generally accepted epithet applied to Arabia but this work will dispel any such illusion by forcefully revealing in its superb illustrations the existence of a spectacular flora.

I must declare a proud personal interest in the author. As one seeking advice on collecting she came to me at the British Museum over 25 years ago and since that time she has spent 15 years in Borneo and in the last decade has accompanied her husband in Saudi Arabia, enjoying exceptional privileges which have enabled her to travel widely and into normally restricted areas. At all times she has collected specimens which have enriched the national collections at Kew, the British Museum, and Edinburgh. To me it is a privilege to commend the work of such a worthy protégée. The volume is the result of arduous comprehensive collecting, recording, and photography. Mrs Collenette's fine specimens, including a number of new species, and her illustrations make a most important contribution to the knowledge of the Arabian flora.

She does not pretend it to be an erudite botanical presentation though every effort has been made to ensure accuracy, and plant identifications have been confirmed by the authorities at the Royal Botanic Gardens at Kew and Edinburgh. It will certainly be a worthy companion volume to the major 'Flora of Arabia' now in preparation as a combined project at Kew and Edinburgh in collaboration with the Arabian authorities.

Sir George Taylor D Sc, FRS, LLD, FRSE, FLS, VMH
Director, Royal Botanic Gardens, Kew, 1956-71





Between Al Ula and Madain Salih

ACKNOWLEDGEMENTS

The collection and naming of over 1,500 plant species, and the arrangement of the data into a form suitable for publication, is possible only with the help of a large number of people. It is a duty to record such help, but for me it is more than this, for I recall with pleasure journeys and days in the field, discussions and even arguments, as I write the names of all those who have helped me.

The first group I recall are those who have helped me to travel in the Kingdom, and a very special mention must be made of Sheikh Ghazi Sultan, who, as Deputy Minister for Mineral Resources, gave the green light to the use of exploration camps and other facilities, for without this, little collection would have been possible. So many others have helped in so many ways; making field arrangements, receiving me into their camps, and driving and flying me to places, often to very inaccessible sites; for such things I thank Keith Ackermann, Zaid Alami, Volke Bege, Bela Bognar, Doug Boyle, Douglas Bruce-Merrie, Phil Butlin, Daniel Cassard, Dr Shaukat Chaudhary, Jim Cole, Richard Collenette, Gustav Dietrich, Jean Rene Daum, Marcel van Ecyk, Jan van Eden, Brian Egan, Mohammed Elmasri, David Fionda, Paul Fisher, Bob Fryer, John and Patsy Gasparetti, John Grainger, Don Hadley, Pete Hancox, David Hill, Roy Jackson, Steve Jarvis, John Jennings, Mike Jennings, Selim Kanan, Hatem al Khalidi, Aeris Klutvyk, Barry Lanz, Gerry Latimer, John Lavranos, Digby Lickfold, Bill and Duffy Liddicoat, Ed MacDonnell, John McHugh, Sami Maddah, Andrew Meardle, Piet and Hermine Mossing, Etienne Motte, Masaa and Abdul Karim Nasher, Nils Palm, Jim Patterson, Simon Poynder, Bill and Jean Proctor, Bob and Helga Prosser, John Revens, Ignace Saltpeteur, Mohammed Sharaf, David Smith, Hywel Smith, John Smith, Malcolm Smith, Doug Stoeser, Rik Sturdy, Dave Sutherland, George Taylor, Jim Thirst, Barny Thomas, Guy Thompson, Denis Tynan, Tom Waters, Peter Woods and Professor Eric Wright.

The burden of naming the collection fell chiefly on botanists at the Royal Botanic Gardens, Kew, and the Royal Botanic Gardens at Edinburgh, although some specimens were sent to specialists at other Institutes for identification. I gratefully acknowledge the work of Susyn Andrews, Diane Bridson, Dick Brummitt, Phil Cribb, Jill Cowley, Barbara Croxall, Frances

Davis, David Field, Jan Gillett, Andrew Grierson, Ray Harley, Ian Hedge, Nigel Hepper, Susan Holmes, Sheila Hooper, Peter Jaeger, Charles Jeffrey, Rose King, Gwyll Lewis, Wessel Marais, Brian Mathew, Robert Mill, Tony Miller, Dave Philcox, Roger Polhill, Alan Radcliffe-Smith, Norman Robson, Martin Sands, Brian Stannard, David Sutton, Kit Tan, Cliff Townsend, Bernard Verdcourt, Gerald Wickens, Chris Grey-Wilson and John Ironside Wood.

Any publication of this sort absorbs many many hours of typing and retyping, particularly as the text changed and grew during the five years it was in preparation, and without the advent of the word processor, the task would have been even greater. I thank Kamal Ansawi, Susan Binns, Mohammad Jafar and David Raphael for their patience with the text. I record my gratitude to Roger Grounds for early botanical editing, Judy Stoeser for general editing and Tony Miller with Rose King for the final botanical editing. To Chris Bailes, John Hale, Tony Hall and Dieter Supthut who grew on previously unflowered plants, and, because I was occasionally unable to get a photograph for myself, I thank Dieter Supthut for his photograph of *Caralluma* sp. aff. *commutata*; John and Patsy Gasparetti for their photograph of the white *Huernia* sp. 1176; John Lavranos for his photograph of *Aloe fleurentinorum* (taken in nearby Yemen) as my plant only flowered in captivity at Kew, and to John Grainger for the flower of *Rhizophora mucronata*, as the plants were in bud and fruit when I found them. Louk van Daalhoff took the photograph of me arranging plants in the press in the tent of the Police Post in Wadi al Uss during a rainstorm.

Finally, my thanks to those who gave me encouragement along the way, particularly Sir George Taylor, for without his counsel I would never have become a botanist; to Betty Vincett, Gren Lucas, Sir James Craig and Emir Zaid Sudairi whose interest provided a vital link to eventual publication; to Dr. Abdulbar Al-Gain, Dr. Mustapha Al-Degaither and Dr. John Grainger of the Meteorological and Environmental Protection Agency for their sponsorship; to my Publishers for their confidence and to my husband for his assistance in so many ways right through the project, from the early days of collection to the final stages of publication.

Sheila Collenette
Greenslade 1985



ACANTHACEAE

Because of severe overgrazing in Saudi Arabia, it is difficult to assess the height these plants would normally attain; even the *Barleria*, many of which are armed with spines, and *Anisotes*, which is very distasteful to animals, are pruned back in times of drought so that most shrubs are less than 50 cm high. The flowers tend to be large and showy and are found in many colours; the author has found that the genus *Ecbolium*, in Arabia at least, is impossible to photograph in the colours that the eye perceives; *E. viride*, a beautiful Nile green, appears on

film as a true pale fawn; *E. violaceum*, a vivid sky blue, is revealed as a dull bluish-lilac, and *E. gymnostachyum*, which is a greyish navy-blue in the field, becomes a clear rose-pink, including even the buds.

In Arabia the most widespread plant in this family is the thistle-like *Blepharis ciliaris*, and it is found from sea level to 5,000 ft.; all the remaining species are mostly found south of Madinah. Three species of *Ruellia* and one *Barleria* flower during the night, the blooms lasting only an hour or two.



***Anisotes trisulcus* ◆**

A stiffly erect dark green leafy shrub 3.5 m high; bright orange-red tubular flowers 3 cm long; no scent. Very common in scattered localities in the south.

10 km SW of Jabal Abu Hassan, off the escarpment between Abha and Najran; in a rocky wadi. 3,000 ft.



***Asystasia gangetica* ◆**

An erect leafy herb 1 m tall; creamy-white flowers 1.2 cm wide with a deep purple blotch in the throat; no scent.

Ad Aridah, ENE of Jizan, near the Yemen border; in the shade of a large grove of *Pandanus*. 800 ft.



***Barleria hispinosa* ◆**

A densely thorny shrub 60 cm high; pale lilac flowers 2.5 cm wide with deeper coloured throat; no scent: Widespread in scattered localities in the south.

Halfway down the escarpment on the road between Abha and Jizan; on a rocky hillside. 3,500 ft.



***Barleria acanthoides* ◆**

A densely spiny dwarf shrub 20 cm high; white flowers 2.2 cm wide with a slender tubular corolla 8 cm long arising from a pair of distinctive red-veined greenish sepals; no scent. Night flowering. Locally common.

Between Khamis Mushayt and Najran, 45 km south of Zahran; in a crevice of a limestone outcrop. 6,200 ft.



***Barleria hochstetteri* ◆**

A perennial bushy woody-based herb 25 cm high; pale lilac-blue flowers 2 cm wide; no scent. A widespread and very variable plant.

Low rocky hills, 10 km east of Jiddah; among rocks. 80 ft.



***Barleria* sp. aff. *hochstetteri* ♣**

A grazed cushion-like woody perennial herb; pure white flowers 1.4 cm wide with deep crimson honey guides; no scent. A blue flowered form grows in the area.

Between Khamis Mushayt and Najran, 45 km south of Zahran; in a crevice of a limestone outcrop. 6,200 ft.



***Barleria* sp. aff. *parviflora* ♣**

A grazed twiggy shrublet to 20 cm tall; deep maroon-purple flowers 1 cm wide, the pale cream throat having black lines; no scent.

One quarter of the way up the escarpment, Jiddah-Taif road; on a dry rocky hillside among acacias. 2,800 ft



***Barleria parviflora* ♣**

A grazed woody herb 5 cm high; distinctly two lipped, pale blue flowers 8 mm wide with crimson streaks in the throat; no scent.

Between Khamis Mushayt and Najran, 45 km south of Zahran; in a crevice of a limestone outcrop. 6,200 ft.



***Barleria proxima* ♣**

A spiny bush 25 cm high; deep glowing orange flowers 1.8 cm wide; no scent.

Between Khamis Mushayt and Najran, 45 km south of Zahran; in a crevice of limestone outcrop. 6,200 ft.



***Barleria trispinosa* ◆**

A spreading densely spiny shrub 25 cm high; pale apricot-yellow flowers 2.2 cm wide; no scent. Fairly widespread in the south.

Halfway down the escarpment on the Taif-Jiddah road; on a rocky hillside. 4,000 ft.



***Blepharis ciliaris* ◆**

A thistle-like prickly herb 10 cm high; the flowers with three-lobed lip 1 cm wide vary in colour from deep bright blue to almost white; no scent. A very widespread and variable plant.

Low rocky hills, 10 km east of Jiddah; in hard sand. 80 ft.



***Blepharis maderaspatensis* ◆**

A weak stemmed branching herb with stems to 1 m long, sometimes rooting at the nodes; the white flowers with dentate lip 5 mm long are cupped in prickly bracts, in small oval heads.

Wadi Sud'r, 44km SSE of Abha; in shade among bushes in a narrow wadi in granite. 3,800 ft.



***Crossandra wismannii* ◆**

A grazed woody-based leafy herb 25 cm high; flowers 1.9 cm wide, opening pure white and aging lilac; no scent.

Halfway down the escarpment, Abha-Jizan road; on a rocky ledge of a narrow ravine. 4,500 ft.



Ecbolium gymnostachyum ◆

An erect grazed woody herb 60 cm high with dark green leaves; grey-blue flowers 2.5 cm wide; no scent.

Jabal Manfah, 50 km NNW of Najran; in a gully of a large sandstone butte. 6,200 ft.



Ecbolium violaceum ◆

A branching woody-based perennial herb 45 cm high; bright blue flowers 1 cm wide; no scent.

Jabal Manfah, 50 km NNW of Najran; in a gully of a large sandstone butte. 6,200 ft.



Ecbolium viride ◆

A branching woody-based perennial herb 60 cm high with dark green leaves; blue-green flowers 2 cm wide, opening in pairs from large green bracts, in terminal spikes; no scent. A fairly widespread plant south of Makkah.

Low rocky hills 10 km east of Jiddah; in drifted sand among rocks. 80ft.



Hypoestes forskalei ◆

A perennial bushy leafy herb 25 cm high; white flowers 8 mm wide with lilac spots in the throat; no scent. Very widespread especially in the southern mountains.

Near the edge of the escarpment to the west of Taif; among rocks. 6,000 ft.



***Justicia flava* ◆**

A slender weak-stemmed herb with stems to 60 cm long; yellow flowers, the lip 1 cm wide; no scent. Fairly widespread in the southern mountains.

Partway down the escarpment between Abha and Jizan; among rocks. 5,500ft.



***Justicia heterocarpa* ◆**

A branching leafy herb 30 cm high; small white flowers with a three-lobed lilac-spotted lip 4 mm wide; no scent.

Wadi Kharar, near the foot of the Taif escarpment, 130 km from Jiddah; among large granite boulders. 1,500 ft.



***Justicia odora* ◆**

A grazed woody-based twiggly herb 8 cm high; yellow flowers, the lip 8 mm wide; no scent. Widespread in the southern mountains.

10 km west of Jabal Abu Hassan, off the escarpment, between Abha and Najran; on a rocky hillside. 3,000 ft.



***Lepidagathis scariosa* ◆**

A bushy very leafy herb 45 cm tall; lilac flowers 2.5 cm long, in almost spherical heads; soft-spiny calyces; slightly pleasantly aromatic.

Below the Police Post, Wadi al Uss (28 km NW of Abha); among shrubs on an old rocky river level. 3,200 ft.



Monechma debile ▲

A bushy leafy woody-based herb 20 cm tall; pale lilac flowers 7 mm wide with reddish streaks on the lip; no scent. The non-flowering plants resemble the *Hypoestes* among which they grow.

Near the head of Wadi al Uss, on the western slope of Jabal Sawdah, 28 km NW of Abha; on a steep exposed rocky slope. 8,000 ft.



Peristrophe paniculata ▲ ▼

A branching weak-stemmed leafy herb to 45 cm tall; deep rosy-pink two-lipped flowers 1 cm wide with darker spots on the lower lip; no scent. Fairly widespread in the south. A white-flowered form grows abundantly higher up the ravine of Wadi Kharar.

Wadi Kharar, near the foot of the Taif escarpment, 130 km from Jiddah; in a steep granite ravine. 1,500 ft.



◆ ***Ruellia grandiflora***

A branched grazed woody shrub 25 cm high with grey-green granular leaves; white flowers 2.5 cm wide with slender tubular corolla 9 cm long; sweet scent. Night flowering.

Jabal Manfah, 50 km NNW of Najran; in a gully of a large sandstone butte. 6,200 ft.



Ruellia patula ◆

A spreading woody-based herb with stems to 25 cm long; lilac-blue flowers 3 cm wide; no scent. Widespread in scattered localities and variable.

Between Khamis Mushayt and Najran, 45 km south of Zahran; in a crevice of a limestone outcrop. 6,200 ft.



Ruellia prostrata ◆

An erect sparsely branching leafy herb with stems to 1.5 m tall; pale bluish-lilac flowers 1 cm wide; very aromatic foliage. Night flowering.

Between Mudhaylif and Muhayl, on the Jiddah-Jizan road; among *Euphorbia* shrubs on a wide plain. 1,300 ft.



***Ruellia* (? *praetermissa*)** ◆

An erect slightly hairy leafy herb 60 cm tall; pale lilac flowers 2 cm wide. Night flowering.

The foot of Jabal Fayfa, 100 km NE of Jizan; among bushes on a rocky hillside. 2,500 ft.



***Ruellia* sp.** ◆

An erect annual herb 35 cm high; pale blue to almost white flowers 1.5 cm wide, the corolla lobes and tube together 4.5 cm long, in pairs; no scent. Night flowering, from 2 am until 5 am.

Low rocky hills, 10 km east of Jiddah; in rock crevices. 80 ft.

AGAVACEAE

Formerly the members of this family were included in the Liliaceae. In Saudi Arabia there are three representatives, the tree-like *Dracaena*, which, growing to 5 m tall, has crowded tufts of sword-like leaves, and two *Sansevieria* species, whose clumps of leaves grow from underground rhizomes. The *Dracaena* and

S. ehrenbergii both have large panicles of relatively tiny flowers and seem to flower fairly regularly in early summer. *S. abyssinica* has a single erect spike of larger flowers and seems to be very shy flowering.



Dracaena serrulata; fruits ➡



◆ *Dracaena serrulata*

A sparsely-branched tree 5 m tall; sword-like leaves 1 m long, in rounded heads; inflorescence many branched, 1.5 m long, with many tiny pinkish buds; no scent. In small scattered colonies from Jabal Radwa southward.

Jabal Abu Hassan, a sandstone massif off the edge of the escarpment, between Abha and Najran; on the summit plateau. 5,500 ft.

Sansevieria abyssinica ➡

An erect herb to 2 m high with fairly wide leaves V-shaped in section, banded and tessellated yellow and blue-green; white flowers 1.5 cm wide with recurved lobes and long narrow corolla-tube, crowded in a spike 38 cm long; sweet scent. Fruit, yellow berries. Night flowering, opening at 8 pm.

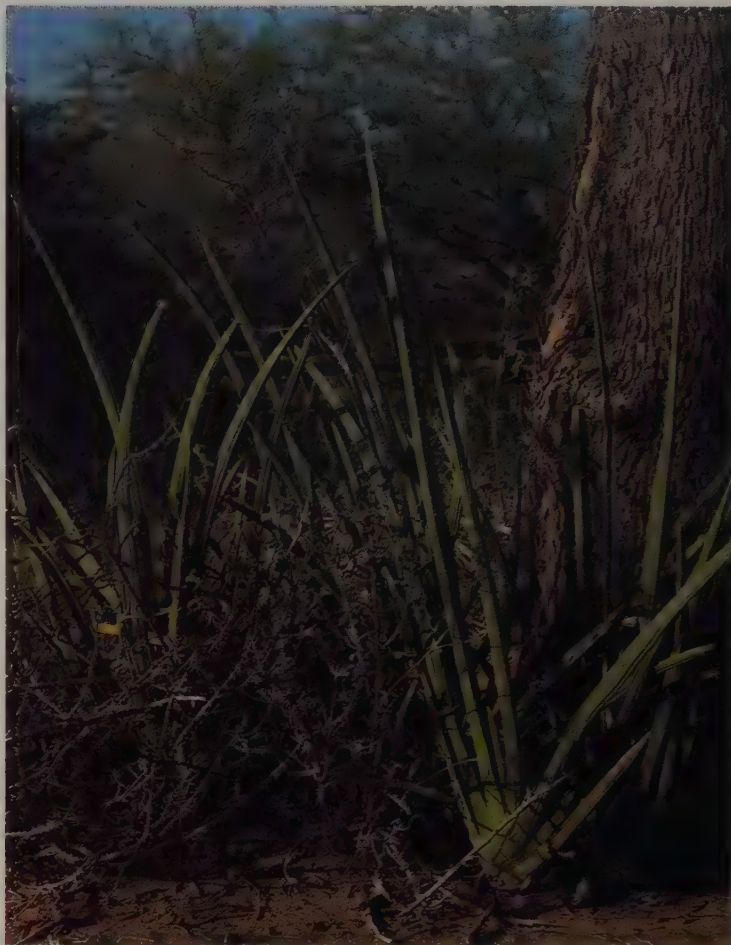
35 km north of Muhayl, on the Jiddah-Jizan road; in shade of *Ziziphus* trees on low granite hill. 1,300 ft.



Sansevieria ehrenbergii ▶

An erect herb 1.75 m high, the thick grooved leaves rounded on the back; branching flower stem to 1.25 m high with narrow greenish flowers 2.5 cm long. Night flowering. Fairly widespread in the south.

Near Al Aridah, ENE of Jizan and close to the Yemen border; growing through the base of *Anisotes* bushes on a rocky hillside. 800 ft.

***Sansevieria abyssinica*; detail** ➤***Sansevieria ehrenbergii*; detail** ➤

AIZOACEAE

In Saudi Arabia the species are all herbs and are more or less succulent. None has scented flowers. Only four have relatively large showy flowers: *Delosperma harazianum*, *Mesembryanthemum nodiflorum*, *Opophytum forsskahlei* and *Corbichonia decumbens*. The

first three open only in full sunlight; whereas the fourth, together with *Glinus lotoides*, open in the late afternoon. The most widespread, from sea-level to around 5,000 ft., is *Aizoon canariense*.



Aizoon canariense ◆

A fairly stout spreading semi-prostrate leafy herb; small fleshy pale yellow flowers 4 mm wide. Very widespread.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; in hard sand. 2,000 ft.



Aizoon hispanicum ◆

A small branching succulent herb, the leaves with rolled edges and stems to 17 cm long; white flowers to 1.5 cm wide.

Near Zabirah, 200 km north of Buraydah; on a gravelly bauxite outcrop. 1,800 ft.



Delosperma harazianum ◆

A spreading dwarf herb with fleshy cylindrical leaves; deep pink flowers 1.5 cm wide shading to white at the centre.

Jabal Sawdah, 28 km NW of Abha; in cracks of a cliff at extreme edge of the escarpment near a tiny stream. 9,000 ft.



Corbichonia decumbens ◆

A semi-prostrate herb 6 cm across with relatively large round leaves; bright magenta-pink flowers 1 cm wide. Widespread in gravelly or stony ground from the plains to 1,500 ft, mainly south of Jiddah. Flowers open in the late afternoon.

Near Hot Springs, Ain Markub, between Al Lith and Makkah; in a sandy wadi. 800 ft.



Gisekia pharnaceoides ◆

A densely leafy prostrate herb with stems 10 cm long; tiny white flowers 4 mm wide striped with green. A widespread plant. Sometimes parts of the plant, affected with a virus, are pink and fleshy.

Near the road between Makkah and Al Lith, 40 km north of Al Lith; in hard sand. 200 ft.



Glinus lotoides ◆

A prostrate branching leafy herb with stems to 25 cm long; white flowers 1 cm wide. Very widespread in damp slightly saline soil.

35 km east of Al Jumum along Wadi Fatimah; in a gravelly wadi near water. 500 ft.



Limeum arabicum ◆

A low spreading herb 10 cm high with slender stems 25 cm long and small elliptic leaves; white flowers 7 mm wide, the petaloid sepals with a green central stripe and the free petals erect and enclosing the stamens. Pendent fruits enclosed within the calyx.

154 km SSE of Al Arid Camp (19° 10' N, 45° 06' E); in drifted sand at base of limestone outcrop among large dunes. 2,500 ft.



Limeum obovatum ◆

A prostrate many-branched woody-based herb with stems 35 cm long and small almost round leaves; white flowers 4 mm wide.

Al Arid Camp (19° 10'N, 45° 06'E), 240 km north of Najran; in hard sand near the roadside. 2,700 ft.



Mesembryanthemum nodiflorum ◆

A prostrate succulent herb with cylindrical leaves and branching stems to 30 cm long; white flowers 8 mm wide.

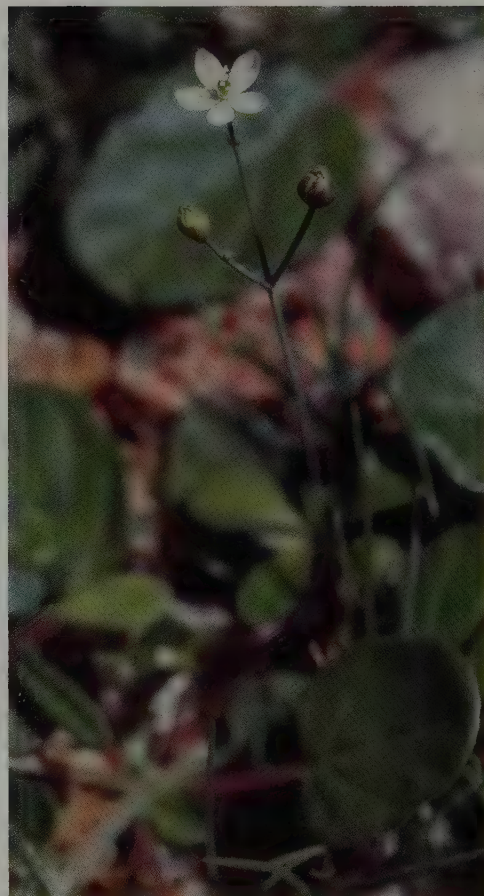
Near Uqlat as Suqur, on the Madinah-Qassim road; on salt flats. 2,850 ft.



Opophytum forsskahlei ◆

A prostrate succulent herb with crowded stout swollen leaves and branching stems to 13 cm high; white flowers 1.2 cm wide.

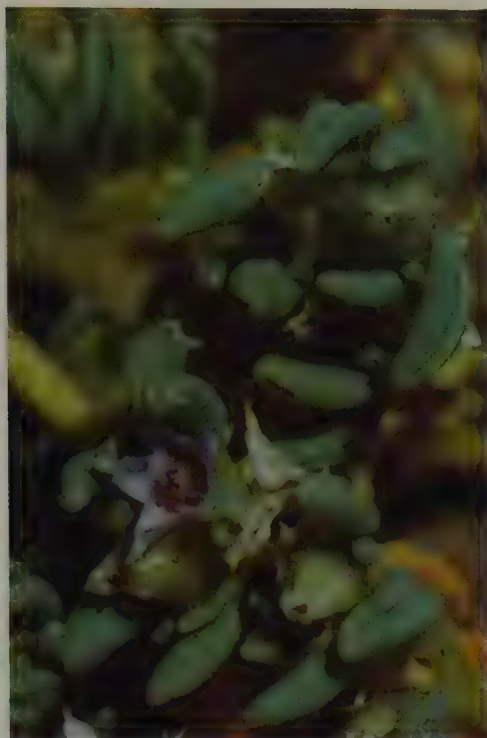
Near Uqlat as Suqur, on the Madinah-Qassim road; on salt flats. 2,850 ft.



Mollugo cerviana ◆

A delicate herb with erect sparsely branching pinkish stems 4 cm tall and a basal rosette of small leaves; white flowers 3 mm wide.

Wadi Kharar, a granite ravine near the foot of the escarpment, Jiddah-Taif road; in a damp sand-pan. 1,500 ft.



Sesuvium sesuvioides ◆

A prostrate spreading fleshy-leaved herb; tiny pink flowers 5 mm wide.

Near Hot Springs, Ain Markub, between Al Lith and Makkah; in a sand-pan near the spring. 800 ft.



Trianthema* sp. nov. aff. *crystallina ◆

A very bushy herb with stems to 18 cm long and small pale green glistening leaves; yellow flowers 5 mm wide with scarlet anthers; sour smell.

Al Wahbah, a crater 100 km north of Radwan, on the Taif-Riyadh road; in volcanic rubble inside the lip of the crater. 4,000 ft.



Trianthema crystallina ◆

A prostrate, mat-forming, leafy semi-succulent herb, with reddish stems to 20 cm long and dark green leaves; tiny papery flowers 3 mm wide with reddish brown anthers.

Jabal Mershid, 40 km east of Qunfudhah; in firm sand. 50 ft.



Trianthema portulacastrum ◆

A juicy leafy herb with ascending stems 30 cm long; white flowers 6 mm wide; stubby bifid fruits; faintly aromatic.

Abu Arish; a weed at the edge of a cornfield in town. 300 ft.



Trianthema triquetra ◆

A prostrate herb with radiating branching stems to 18 cm long and small cylindrical succulent leaves; in fruit only, the fruits 1 mm wide, cupped in a persistent calyx.

Bani Malek, on the NW side of Jabal Fayfa, 100 km NE of Jizan; in hard sand on dry stony hillside. 2,500 ft.



Zaleya pentandra ◆

A prostrate mat-forming leafy semi-succulent herb covering half a square metre; pale pink flowers 4 mm wide. Fairly widespread especially in the south.

Between Mikhwa and Muhayl on the Jiddah-Jizan road; on a sandy stream-bank near cultivation. 1,200 ft.

AMARANTHACEAE

In Saudi Arabia the species are all herbs but the two *Aerva* species can appear almost woody enough to be classified as shrublets. All have tiny flowers arranged in spike- or head-like inflorescences, and each flower is often subtended by well-developed chaffy scales (bracteoles); the lateral flowers are often sterile, developing spines, wings or hairs that aid

dispersal of the fruits. The three members of the genus *Amaranthus* resemble some of the weedy Chenopodiaceae to which family they are closely related. The most widespread is *Aerva javanica*, which has thick branching tassels of tiny white flowers buried in white wool-like hairs, and although it is neither aromatic nor spiny, it is nevertheless seldom grazed.



◆ ***Achyranthes aspera***

An erect slender herb 40 cm tall; pale pink papery flowers 1.5 mm wide, in spikes; no scent.

Just below the lip of the escarpment near the King's Palace south of Abha; in a cliff crevice. 8,000 ft.



***Achyranthes aspera* var. *sicula* ♀**

A weak-stemmed leafy branching herb nearly 1 m tall; pale green papery flowers 1.5 mm wide, in long spikes; no scent.

One third of the way up the escarpment, Jiddah-Taif road; among shrubs in a small ravine. 3,500 ft.



***Aerva javanica* ♀**

A branching woody-based herb 30 cm high with thick yellowish-green leaves; tassels of clustered white bud-like flowers arising from the apex of the branching stems; no scent. A very widespread plant.

Jabal Manfah, 50 km NNW of Najran; in a gully of a sandstone butte. 6,200 ft.

***Alternanthera pungens* ♀**

A prostrate leafy herb with stems to 25 cm long; tiny greenish flowers set among clusters of chaffy spiny bracts 5 mm long.

Wadi al Uss, on the western slope of Jabal Sawdah, 28 km NW of Abha; under trees in gravel on an old river level in a wooded ravine. 3,200 ft.



♂ *Aerva lanata*

A bushy slender stemmed herb 50 cm high with almost circular leaves; tiny white flowers clustered in spikes 1.8 cm long along the stems; no scent.

Jabal Manfah, 50 km NNW of Najran; in a crevice on a sandstone butte. 6,200 ft.



Alternanthera sessilis ◆

A sparsely branching leafy herb 45 cm tall, the slightly dentate leaves in whorls; papery pale pink flowers 4 mm long, in rounded heads in the leaf axils.

Head of the dam, Abu Arish, near Jizan; in damp sand in a cornfield. 500 ft.



Amaranthus graecizans ◆

An erect leafy herb 12 cm high; greenish or pinkish flowers 2 mm wide; no scent. Very widespread and somewhat variable.

Near Kilometre 100, Makkah By-Pass between Jiddah and Taif; in a sandy wadi in the shelter of an acacia. 1,000 ft.



Amaranthus hybridus ◆

A leafy herb 12 cm high; tiny whitish flowers set among short bristly hairs, in terminal spikes; no scent.

Near the waterfall between Abha and Jabal Sawdah, NW of Abha; in damp sand near the stream. 8,300 ft.



Amaranthus spinosus ◆

An erect leafy spiny herb to 35 cm tall; tiny greenish flowers set among pale green chaffy bracts 1 mm long, in terminal spikes; no scent.

Al Aridah, near the Yemen border and east of Jizan; in the shade of a *Pandanus* grove. 800 ft.



Celosia polystachya ◆

A weak-stemmed leafy shrublet 1 m high; white, pink-striped flowers 2 mm wide, crowded in terminal branching spikes; very sweet scent.

Wadi al Uss, mid-way between Muhayl and the Police Post west of Jabal Sawdah; on a gravel cliff bordering the wadi. 2,000 ft.



Digera muricata ◆

An erect branching leafy herb 40 cm high; deep magenta flowers 4 mm wide, in terminal spikes; no scent.

Wadi Khulays, 75 km NNE of Jiddah; at the edge of an irrigated field. 200 ft.



Celosia trigyna ◆

A leafy herb with stems to 50 cm long; pink and white flowers 2 mm wide, clustered along a spike 25 cm long; no scent.

Jabal Fayfa, 100 km NE of Jizan, on steep SW approach road; on rocky hillside. 3,900 ft.



Psilotrichum gnaphalobryum ◆

A weak slender-stemmed leafy-based perennial herb with stems 1 m or more long; pale greenish flowers 3 mm long; no scent.

Halfway up the escarpment, Abha-Jizan road; growing through a bush in a ravine. 4,000 ft.



***Pupalia lappacea* var. *velutina* ♣**

A slender herb with stems 50 cm long; tiny greenish flowers, in spherical heads 1 cm in diameter, with long hooked hair-like bracts; no scent. Fairly widespread in the south.

12 km southwest of Jabal Abu Hassan, a sandstone massif off the edge of the escarpment between Abha and Najran; creeping through a thorn bush on a rocky hillside. 3,000 ft.

AMARYLLIDACEAE

The eight species found by the author all have relatively large flowers, which are individually short-lived. The plants have bulbs, those of the *Crinum* being very large. Two of the species of *Pancratium* each have leaves distinctively twisted, and those of *P. sickenbergeri* and *Scadoxus* appear after flowering, which usually takes place in the autumn. The leaves of *P. maximum* start to grow with the flower spike and continue growing long after the flower has died.

◆ ***Crinum yemense***

A crowded-leaved bulbous plant with flower stem to 60 cm tall; white flowers 6 cm wide; sweet scent. Widespread in the Asir and southern Hijaz both near water and on rocky hillsides.

Tannumah, a watered granite valley 12 km south of An Nimas, Taif-Abha road; at edge of stream. 6,500 ft.





Ixiolirion tataricum ◆

A small bulb with brown tunics and a few slender leaves, the rather weak flower stem to 15 cm long; tubular lilac-blue flowers 2.5 cm wide, in loose heads; no scent.

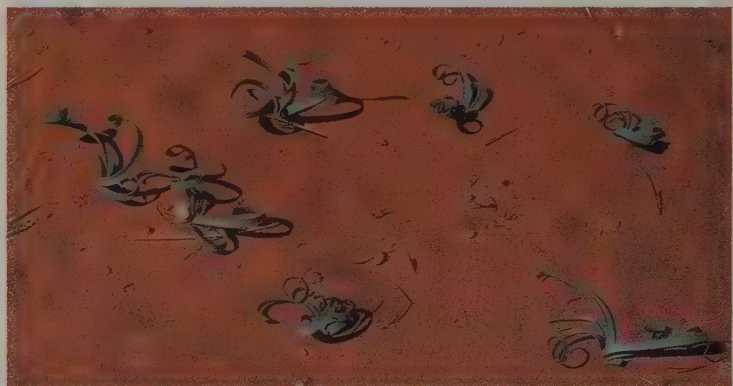
35 km west of Turayf Camp (31° 40' N, 39° 29' E); in drifted sand of shallow gully on limestone plateau. 2,900 ft.



Pancratium maximum ◆

A bulb with many very papery brown tunics and with two to four narrow green leaves to 30 cm long growing from the centre; these are ringed by the dead leaf bases of previous years' growth; erect white flowers 10 cm wide with slender corolla-tube 11 cm long; sweet scent; open at night. Summer flowering, immediately after the first rains, and taking just seven days from the start of growth to flowering. In scattered localities at medium to high altitude in the Asir and southern Hijaz.

Halfway up the escarpment, Jiddah-Taif road; among rocks on a fairly exposed hillside. 4,000 ft.



◆ ***Pancratium sickenbergeri*** ◆

A very long narrow bulb with thick white roots and blue-green strap-shaped leaves corkscrewed near the tip; the small flowers, not seen, appear long after the leaves have disappeared.

Near Shiqri on the road to Tabuk; in drifted red sand among sandstone buttes. 3,000 ft.



Pancratium tortuosum ◆◆

A rounded bulb with glaucous leaves 60 cm long and corkscrewed along their length; flower stems 50 cm high; large flowers 12 cm wide having pale green tepals and with a white inner corona made up of the expanded fused filaments of the stamens; sweet scent. Each fragile bloom opens in the evening and dies by 10 am. Locally fairly widespread.

Between Makkah and Al Lith; in drifted sand at the base of a low rocky hill. 100 ft.



Pancratium tenuifolium ◆

A leafy bulb with erect glabrous leaves to 50 cm long and 3 cm wide; rounded bulb with brown papery tunics; the solitary white flowers not seen.

12 km north of Muhayl road junction, Jizan-Qunfudhah road; in full sun among lava blocks in shallow gully. 8 ft.



***Pancratium* sp. 4954** ◆

A dark brown rough skinned slightly oval bulb with very shiny dark green untwisted leaves 15 cm long; flowers not seen. The plants grow in clumps and though the leaves resemble those of *P. maximum*, the bulb is similar to *P. tortuosum*.

Jabal Sayid Camp, SE of Madinah; in rubble near summit of a granite outcrop. 3,300 ft.



◆ *Scadoxus multiflorus*

A bulb with two to five leaves at the apex of white, crimson-spotted stems. The narrowly lobed scarlet flowers 2.5 cm wide are in large spherical heads 14 cm wide and usually appear before the leaves.

Jabal Fayfa, 100 km NE of Jizan; in shade of a large boulder on a steep hillside. 5,300 ft.

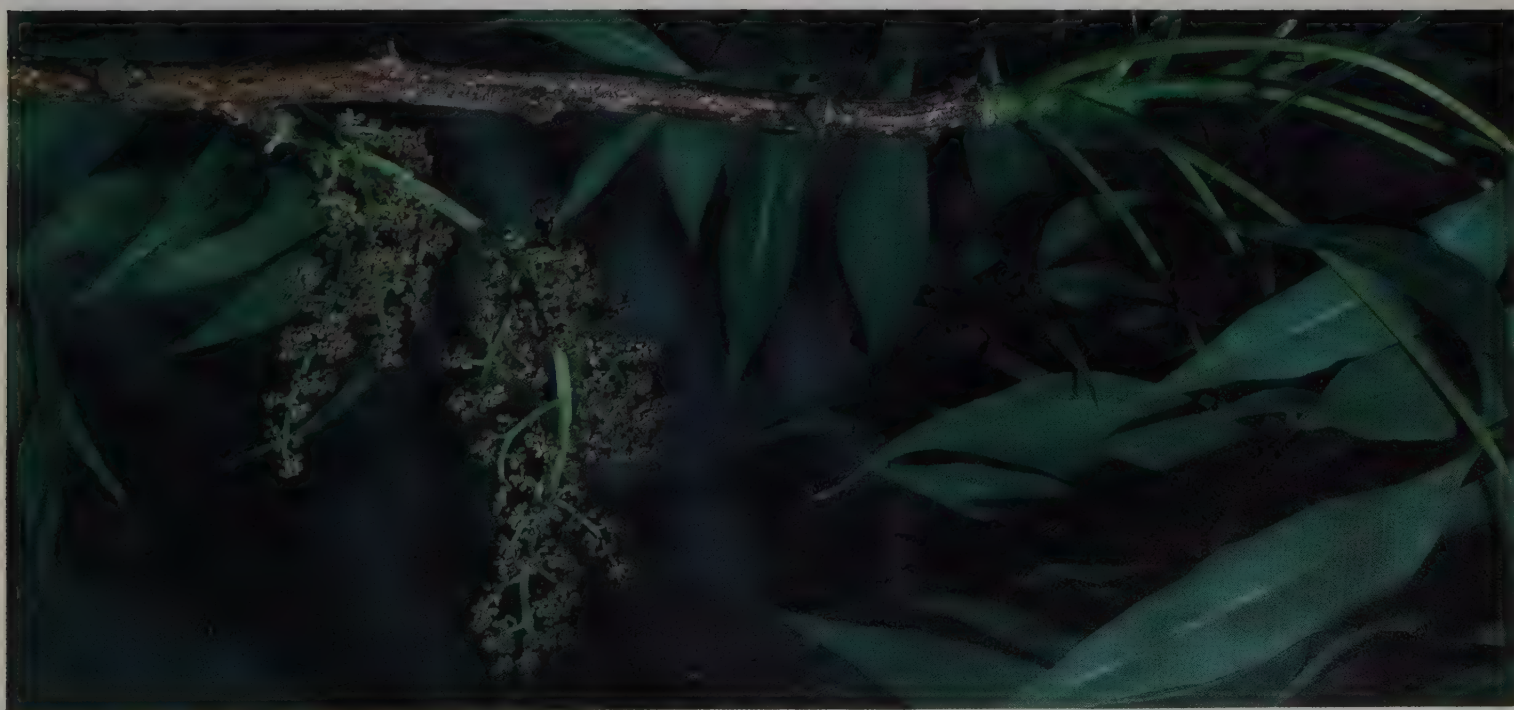
ANACARDIACEAE

Of the five species in Saudi Arabia, three are deciduous and can grow into quite substantial trees, though *Rhus tripartita* is shrublike. Although not particularly aromatic, the plants are resinous and both *Pistacia* and *Rhus retinorrhoea* have leaves that when mature stick to the drying paper. Although fairly widespread, nowhere are the plants very numerous.

◆ *Pistacia falcata* ◆

A bushy leafy tree 8 m high, the leaves with many leaflets; tiny reddish flowers 2 mm wide, in panicles; sweet scent. Fairly widespread in the Asir and south Hijaz.

55 km south of Baljurshi, on the Taif-Abha road; on a rocky hillside. 7,000 ft.





***Pistacia cf. khinjuk* ▲**

A bushy tree 3 m high, the leaves with red petioles and few leaflets; red bud-like flowers; sweetly aromatic.

Jabal Dabbagh, a 7,500 ft. granite massif 88 km SW of Tabuk; on a steep rocky hillside. 5,500 ft.



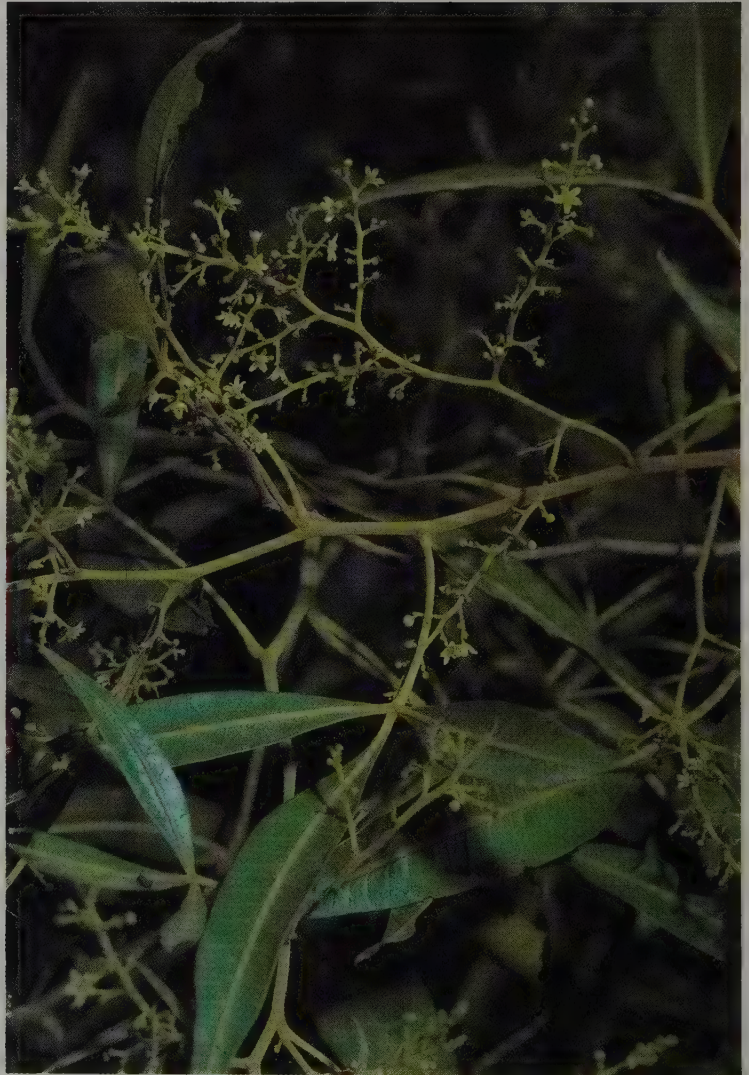
***Pistacia cf. khinjuk*; fruits ▲**



***Rhus abyssinica* ▲**

A leafy shrubby tree nearly 3 m tall; underside of leaves brown-hairy; tiny greenish flowers 2 mm wide, in panicles; no scent.

A red granite mountain 15 km SW of Al Hadda, on the Jiddah-Taif road; near the lip of the escarpment. 7,000 ft.



***Rhus retinorrhoea* ▲**

A very leafy shrubby tree 2 m high with narrow leaves; pale green flowers 2 mm wide, in panicles; small, flat, shiny green fruits. Fairly widespread in the mountains south of Madinah.

Tannumah, a watered valley among pink granite hills, 12 km south of An Nimas on the Taif-Abha road; on a rocky hillside. 6,500 ft.



◆ *Rhus tripartita* ◆

A bushy leafy shrub 2 m high, slightly thorny; greenish-yellow flowers 2.5mm wide, in clusters; faint sweet scent; bright red, shiny, flat-sided fruits.

Aban al Ahmar, a granite massif 143 km SW of Buraydah; on the summit plateau, in a shallow ravine. 4,200 ft.

ANNONACEAE

This is a large family of mainly tropical trees, and several species are cultivated for their fruits. *A. squamosa* was probably originally an introduction to the Arabian Peninsula, but in the Yemen this species has become naturalized and grows wild. The single collection made by the author was certainly a wild tree; it was extremely difficult to reach any part of it as it grew on a cliff. Several other plants were observed in the locality, also apparently untended.

◆ *Annona squamosa* ◆

A shrubby tree 4 m tall, with dark green leaves; in bud and with an old fruit 2.5 cm wide.

Jabal Fayfa, on the steep SW approach road, 100 km NE of Jizan; on a very steep rocky slope. 3,900 ft.



APOCYNACEAE

Five species have been found in Saudi Arabia and each is the sole representative of a genus, though some have argued that the tree-like form of *Adenium obesum*, *A. arabicum*, is a separate species. The five species are also found in a diversity of forms; *Acokanthera* is a tree, *Adenium* is classed as a succulent, *Carissa* and *Nerium* are both shrubs, and *Rhazya* is a perennial herb. All have a milky latex and many are poisonous, the 'oleander' particularly so; many African tribes prepare arrow poison from

species of *Acokanthera*, though together with *Carissa* both have fruits that are edible for humans. The flowers, except for *Rhazya* and *Adenium*, are sweetly scented, but *Adenium* so closely resembles its fragrant relative 'frangipani' that most people think it must be scented. Grazing stock usually avoid the plants, though leafy branches of *Acokanthera* are often lopped and fed to goats.



◆ ***Acokanthera schimperi***

A small tree 3 m high with dark green leaves; pinkish white flowers 4 mm wide; sweet scent.

Jabal Abu Hassan, a sandstone massif off the edge of the escarpment between Abha and Najran; on the summit plateau. 5,500 ft.



◆ ***Adenium obesum*** ◆

A swollen pale-trunked tree to 4 m high; pale pink flowers 3 cm wide with red edged petals and red lines in the yellowish throat; no scent. A widespread plant in the southern mountains and foothills. When growing in rock clefts at high altitudes the trunk is reduced, and its swollen body entirely fills the crack for a metre or more.

Abu Arish, near Jizan; on a rocky outcrop. 500 ft.



Carissa edulis ◆

A sprawling tangled thorny shrub 5 m wide, very leafy; pale pink flowers 6 mm wide; strong sweet scent. The ripe black fruits are edible.

A red granite mountain 45 km south of Baljurshi, on the Taif-Abha road; growing on a well-vegetated rocky hillside. 6,500 ft.

Rhazya stricta ◆

An erect evergreen stout-stemmed woody herb 60 cm tall with crowded narrow leaves; white flowers 5 mm wide; no scent. A very widespread plant that is seldom grazed.

Near the foot of the escarpment, Makkah-Taif road; in hard sandy wadi. 2,000 ft.



Nerium oleander ◆

A bushy leafy shrub 4 m high; rich pink flowers 2.5 cm wide; faint sweet scent. A very poisonous plant. Locally abundant.

A sandstone ravine of the headwaters of Wadi Qaraqir, 75 km SE of the iron-ore deposit at Wadi Sawawin; growing in damp sand at edge of streams. 2,800 ft.





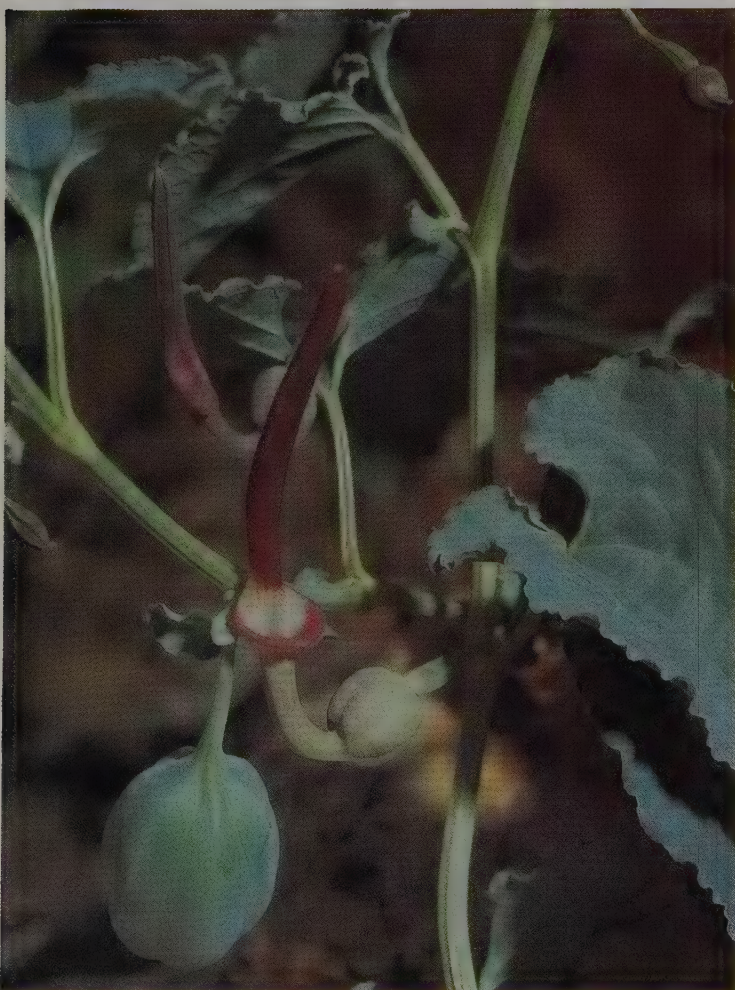
ARACEAE

Members of the Araceae family are found mainly in the tropics and though a few species are found in the Yemen and Iraq it was a surprise to find any in Saudi Arabia, and in an area visited many times by the author, chiefly in the spring. The dark low-growing flower spikes are easily overlooked and it was the leafy stem, maturing in late summer, that drew attention to the plant. The starchy swollen tuberous corms of several species, chiefly *Colocasia esculenta*, are widely grown for food in the tropics.

◆ *Sauromatum venosum*

A herb with a rounded fleshy underground corm and leaf stem to 75 cm long with compound leaves. The flower spike, which appears in the spring, was not seen.

13 km NW of Abha, Jabal Sawdah road; in a shady rock crevice near a stream. 8,500 ft.



ARISTOLOCHIACEAE

Only one species of this fairly large family is found in Saudi Arabia and the extraordinarily shaped flower, which is really the calyx as there are no petals, is difficult to describe in a few words. Three other species in the same genus each carries a popular name that attempts to describe its shape; the 'Dutchman's pipe', the 'pelican flower' and the 'bird's head'. *Aristolochia bracteolata* most closely resembles the pitcher of a small *Nepenthes*, though the erect 'lid' is as long as the 'pitcher'. It would be a showy plant if the rather small flowers were not overshadowed by the abundant foliage. While photographing a plant on the edge of a citrus garden, the author was approached by the owner who explained that the leafy vines were used to bind up wounds and presumably aided healing.

◆ *Aristolochia bracteolata*

A tangled leafy vine with stems to 2 m long; curved pale brown pitcher-shaped flowers with a dark purplish brown stiffly erect 'lid' covered with short purplish hairs; flower 3 cm long overall; sour smell.

Wadi Kharar, a narrow ravine in granite near the foot of the Taif escarpment, 130 km ESE of Jiddah; scrambling over rocks. 1,500 ft.

ASCLEPIADACEAE

The family is well represented in Saudi Arabia with a wide variety of plant forms; shrubs, herbs, vines and succulents. Many have a copious milky juice when cut and are sometimes known as milkweeds. The most widespread is the shrubby tree *Calotropis procera* which, although poisonous, is grazed in times of drought; the Bedou used to prepare gunpowder from its stems and the sap has medicinal properties. Many species have a sweet scent, but most of the succulents are fly pollinated and smell of rotting meat; the *Ceropegias* however have no detectable smell but are probably pollinated by specialized insects as the narrow tubular flowers are usually lined with hairs and often have the corolla lobes united at the tips. The Asclepiadaceae have very distinctive fruits, often in pairs and

very large in relation to the flower, but all have flat seeds with a plume of silky hairs. Many of the flowers are individually short lived, those of *Pentatropis spiralis* remaining open only a few hours, but many species have clusters of flower buds that open singly over a period of days thus prolonging the flowering period. Only *Leptadenia pyrotechnica* and *Periploca aphylla* are readily grazed by stock, but humans can and do eat the stems of most of the succulents except some species of *Caralluma*; these are very bitter but the leaves of *Odontanthera radians* are bland and almost tasteless. So far this family has yielded more new species than any other including a number in *Sarcostemma* belonging to the *S. viminale* group.



Blyttia fruticosum ◆

A bushy shrubby herb 35 cm high with narrow leaves, the young stems sometimes self-twining; greenish-yellow flowers 4 mm wide; sweet scent. Locally common.

Low rocky hills, east of Jiddah; growing in the open, never under shrubs. 80 ft.

Calotropis procera ◆

A densely leafy bushy shrub 3 m high, which oozes a copious milky sap when cut; pale greenish flowers 1 cm wide, the corolla lobes tipped with pale purple, in large heads; faint sweet scent; very large, almost spherical warty-skinned fruits. A widespread plant especially in the lowlands; it sometimes grows as a small tree.

Near Jiddah; on waste ground. 50 ft.



Calotropis procera; general view ◆





Caralluma* sp. aff. *commutata ▲

An erect four-angled succulent with long soft teeth and green and grey mottled stems 6 cm tall; shallow mahogany-red flowers 3.2 cm wide, the margins of the lobes often reflexed and with a raised annulus-like ring encircling the corona; bad sweetish smell. Although the flowers are similar to *C. commutata* the corona is different.

Wadi al Uss, 25 km east of Muhayl; in crevices on rocky hillside among scattered shrubs. 2,000 ft.



Caralluma commutata ▲ ▲

An erect four-angled succulent with long soft teeth and green and grey mottled stems 6 cm tall; flat shallow mahogany-red flowers 4 cm wide, the surface slightly downy and the bright brown shiny corona sunk into either a round or a five-angled depression; no scent. Fairly widespread in scattered localities in the southern foothills. A rare plant previously recorded with certainty from a single locality in Ethiopia; a new record for Saudi Arabia.

14 km north of Muhayl, on the Jiddah-Jizan road; on a rocky hillside in the shelter of acacias. 1,200 ft.



Caralluma deflersiana ▲

A semi-prostrate mottled grey-green succulent with long soft teeth and stems 6 cm long; very deep purplish-black flowers 3.5 cm wide, the campanulate corolla 3.5 cm deep; slight bad smell.

Near Al Aridah, SE of Jizan; in the shade of bushes. 800 ft.



Caralluma edulis ◆

An erect slender succulent 30 cm tall, the grey-green stems mottled with purple and with a long deciduous flower spike at the apex; pale greenish-fawn cup-shaped flowers 1.2 cm wide with very slender reflexed corolla lobes; no scent. In scattered localities in the southern lowlands.

Jabal Merhid, 40 km east of Qunfudhah; among grass tufts in a sandy wadi. 50 ft.



Caralluma eremastrum ◆

A four-angled grey-green succulent with long soft teeth and stems 6 cm long; pale green flowers 2.5 cm wide, the narrow corolla lobes reddish brown at the base; no scent.

Jabal Fayfa, 100 km NE of Jizan; among rocks on a steep well-vegetated hillside. 5,000 ft.



Caralluma penicillata ◆ ◆

An erect four-angled branching succulent to 1 m high with tapering green stems and flowers borne in heads along the sides near the apex; pale green flowers 8 mm wide with golden spots, golden corona and tufts of purple hairs on the tips of the corolla lobes; no scent. Abundant in the southern foothills though a colour form with purple spots and corona seems the more widespread in Saudi Arabia.

Grandi Lavori Road, 25 km from the junction with the Jiddah-Jizan road; among rocks. 2,400 ft.





Caralluma petraea ➤

An erect many-branched pale greyish-stemmed succulent 30 cm high; almost spherical head of creamy-yellow flowers densely speckled with crimson; the deep tubular corollas, each 1 cm wide, have recurved lobes tipped with short tufts of red hairs; strong rotting meat smell. Fairly widespread in the southern mountains.

Near Suq al Ithnayn, 58 km SE of Abha; in rocky ground. 7,500 ft.



Caralluma plicatiloba ➤

An erect green succulent to 14 cm high with crowded branching stems; gold flowers 1.5 cm wide, in heads, the corolla with raised crimson bars and spots and with a few white hairs at the apex of the strongly reflexed lobes; unpleasant rotting meat smell. Fairly widespread in the Asir and southern Hijaz, but also found as far north as Shiqri.

Al Hadda, on the Jiddah-Taif road; among granite rocks near the lip of the escarpment, in the shade of a juniper. 7,000 ft.



◆ ***Caralluma russeliana***

A stout erect pale green four-angled succulent 1 m high, branching from the base; the deep purple soft-hairy flowers 1 cm wide are borne in a dense spherical head from the apex of the stem; rotten meat smell. The largest *Caralluma* and widespread south of Jiddah from sea level to 3,500 ft.

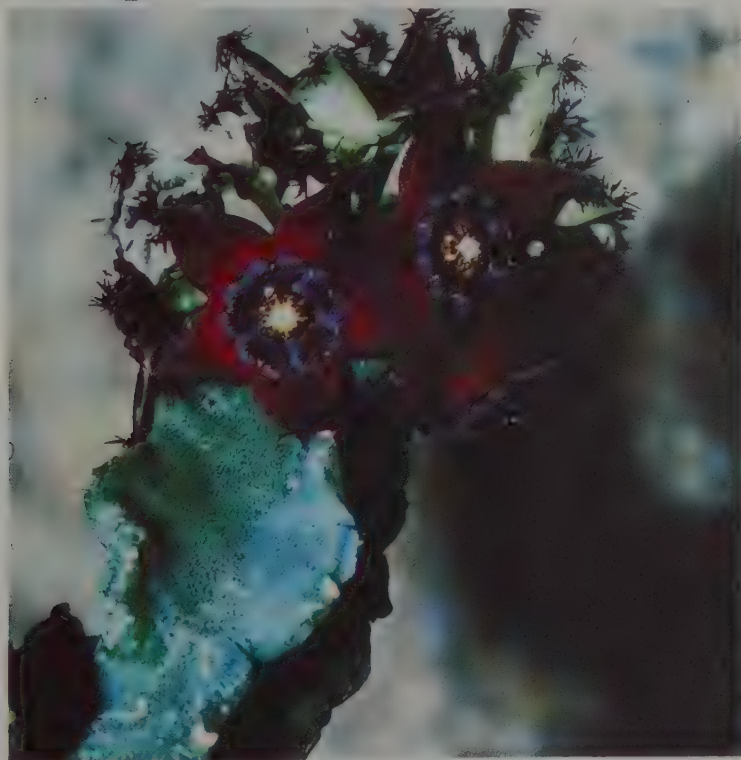
Between Jiddah and Taif, near the foot of the escarpment; among rocks. 2,400 ft.



Caralluma quadrangula ♀

An erect green succulent 35 cm high with fairly slender four-angled branching stems; bright yellow flowers 1 cm wide with deep yellow corona; sweet scent. Perhaps the most widespread *Caralluma* south of Makkah.

Wadi Wejj, 15 km SW of Taif; on a steep rocky hillside. 5,800 ft.



Caralluma shadhbana ♀

A spreading many-branched succulent 10 cm high; dark purplish-red flowers 1 cm wide, in heads, the corolla lobes tipped with thick tufts of black hairs; no scent. The type of this species came from Yemen where the flowers are green-backed with red freckles.

1 km east of Muhayl, Jiddah-Jizan road; in hard sand under scattered acacias. 1,200 ft.



Caralluma shadhbana* var. *barhana ♀

A spreading branching succulent with stems 7 cm long; deep crimson glabrous flowers 1.2 cm wide with a pale bluish ring round the white-centred corona; faint unpleasant smell. In scattered localities south of Makkah from 1,200 ft. to 6,200 ft.

On the Abha-Najran road, 45 km south of Zahran; compressed in a crevice of a limestone outcrop. 6,200 ft.



Caralluma sinaica ♀

An erect grey-green succulent 20 cm high, streaked with red and branching from near the apex of the stems; nodding pale yellow flowers 8 mm wide and slightly hairy on the inside; no scent.

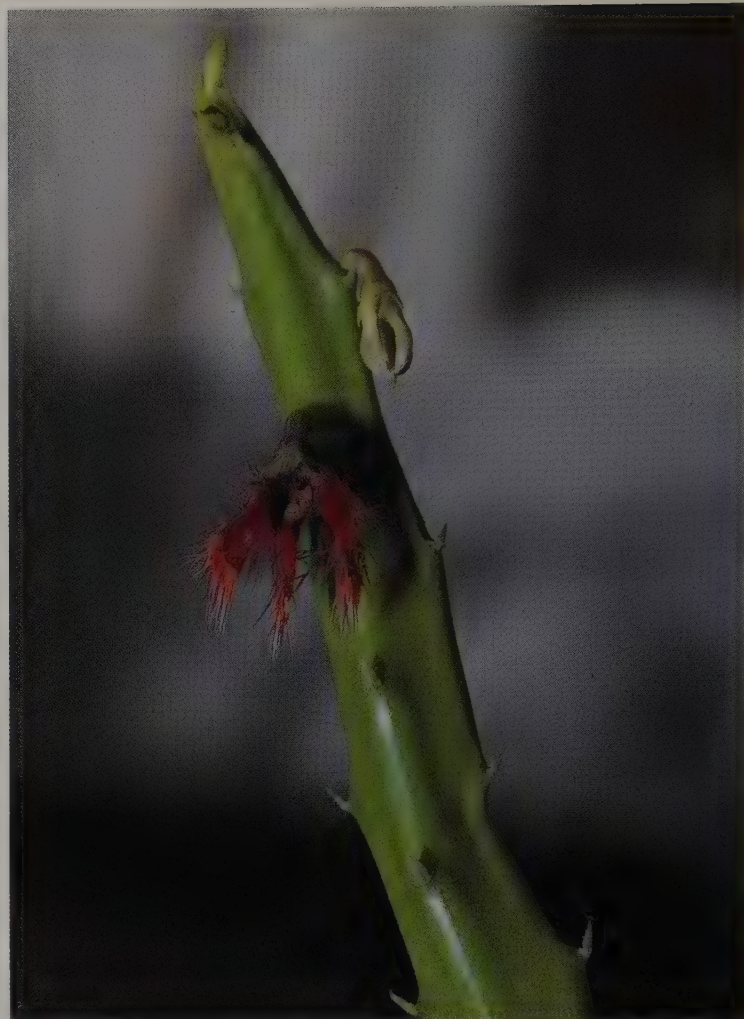
Wadi Sawawin iron ore deposit, 75 km SW of Tabuk; in crevices on a steep rocky hillside. 3,000 ft.



Caralluma sinaica* var. *baradii ▲ ◆

An erect grey-green succulent 20 cm high, streaked with green and purple and branching from the base; pale yellow very hairy flowers 8 mm wide; no scent. A deep pink colour form with larger flowers 1.1 cm wide was found nearby in a limestone outcrop near Zahran; another form has pale green flowers spotted with crimson and with purple hairs.

Jabal Manfah, 50 km NNW of Najran; in a gully of a sandstone butte. 6,200ft.



Caralluma subulata ▲

An erect grey-green slender-stemmed succulent 25 cm high; reddish-purple flowers 9 mm wide fringed with purple hairs; no scent. Similar to *C. edulis* but much more widespread and the tapered stems do not have the deciduous apical flower spike.

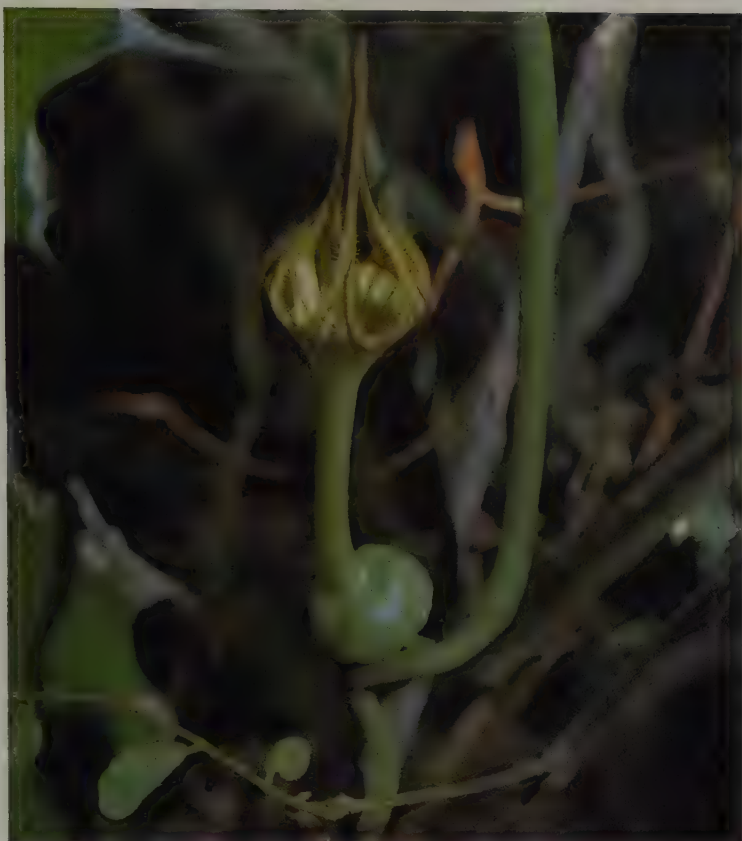
15 km north of Muhayl, on the Jiddah-Jizan road; under acacias in gravelly sand. 1,200 ft.



Caralluma wissmannii ▲

An erect four-angled succulent 7 cm tall with pale and dark green dappled soft-toothed stems; brownish-red downy flowers 2.5 cm wide, the slender corolla lobes yellow towards their apex; bright yellow corona; no scent. Fairly widespread in the southern mountains.

Jabal Sharda, a granite mountain west of Baljurshi; among rocks near the summit. 7,000 ft.



Ceropegia arabica ◆

A leafless greyish smooth-stemmed twiner with stems 1 m long; pale cream flowers 5.5 cm long with greenish-yellow markings and long, often twisted united corolla lobes; no scent.

Jabal Fayfa, 100 km NE of Jizan; twining among *Abrus bottae* bushes on steep rocky scrub-covered hillside. 5,200 ft.



Ceropegia* sp. aff. *arabica ◆

A leafless greenish smooth-stemmed twiner with stems 2 m long; pale cream flowers 5.5 cm long with green markings, the tips of the narrow reflexed corolla lobes united and with distinct keels; no scent.

Jabal Fayfa, 100 km NE of Jizan, twining among bushes on a steep rocky scrub-covered hillside. 5,200 ft.



Ceropegia devecchii ◆

A leafless grey stout-stemmed twiner with purplish blotches and with stems to 3 m long; flowers wide-opening, 4.2 cm long and 3.8 cm wide across the corolla lobes, pale cream spotted with maroon and with an orange blotch at the base of the lobes; densely white-hairy inside; no scent. Locally fairly widespread.

Near Abu Arish, east of Jizan; climbing through an acacia. 500 ft.



Ceropegia* sp. nov. aff. *aristolochioides ◆

A green smooth-stemmed twiner with many-branched stems to 3 m long and heart-shaped leaves; creamy tubular flowers 3.3 cm long, heavily freckled with purplish-red and with a blue blotch at the tip of the united corolla lobes; short white hairs inside the corolla; no scent. Abundant in the two localities so far discovered, which included Jabal Fayfa.

Wadi al Uss, NW of Jabal Sawdah, near Abha, near the Police Post; growing among *Euphorbia* bushes on the rocky wadi banks. 5,300 ft.



***Ceropegia* sp. aff. *devechii* var. *adelaidae* ♣**

A leafless grey stout-stemmed twiner with purplish blotches and with stems 3.5 m long; flowers wide-opening, 5 cm long and 6 cm wide, the corolla cream freckled with crimson spots and the pale green lobes lined with shiny crimson hairs; there is a deep purple blotch at the base of the lobes; no scent. This species is similar to the type (found in Tanzania) but has smooth instead of warty fruits. Fairly widespread in the southern foothills.

44 km north of Muhayl, Jiddah-Jizan road; in acacia scrub. 1,200 ft.



***Ceropegia* *mansouriana* ♣**

A leafless pink slender-stemmed twiner with stems 2 m long; flowers 3 cm long and 1 cm wide with tips of corolla lobes united twice forming an open crown; corolla cream with reddish-brown blotches and a large purple blotch at the first point of union of the lobes, white hairy inside; no scent. Fairly widespread in the southern foothills.

44 km north of Muhayl, Jiddah-Jizan road; in acacia scrub. 1,200 ft.



***Ceropegia* *superba* ♣**

A leafless pink slender-stemmed twiner with stems 2 m long; flowers to 8 cm long and 1.3 cm wide, with extreme tips of corolla lobes united; corolla creamy with crimson and grey flecks and a bright purple band near the base of the lobes, which are green towards their apices and sometimes have a few black vibratile hairs; no scent.

Jabal Fayfa, 100 km NE of Jizan; among scrub on a steep rocky hillside. 5,200 ft.



***Ceropegia tihamana* ◆**

A leafless grey slender-stemmed twiner with stems 2 m long; narrow flowers 1.5 cm long and 5 mm wide with united corolla lobes forming a distinct knob; corolla pale grey-green with red streaks and freckles, the inside fringed with crimson hairs; no scent.

Near Abu Arish, east of Jizan; climbing through an acacia. 500 ft.



***Ceropegia* sp. aff. *variegata* ◆**

A leafless grey stout-stemmed twiner with purplish blotches and stems 2 m long; flowers wide-opening, 2 cm wide across the lobes, cream spotted maroon and with a black and orange blotch at the base of the lobes; densely white hairy inside; no scent. Similar to *C. devechii* but the flowers smaller and sturdier and the first inflation at the base of the tube much longer.

Jabal Fayfa, 100 km NE of Jizan; among shrubs on a steep fairly open hillside. 4,800 ft.



***Ceropegia* sp. nov. 3160 ◆**

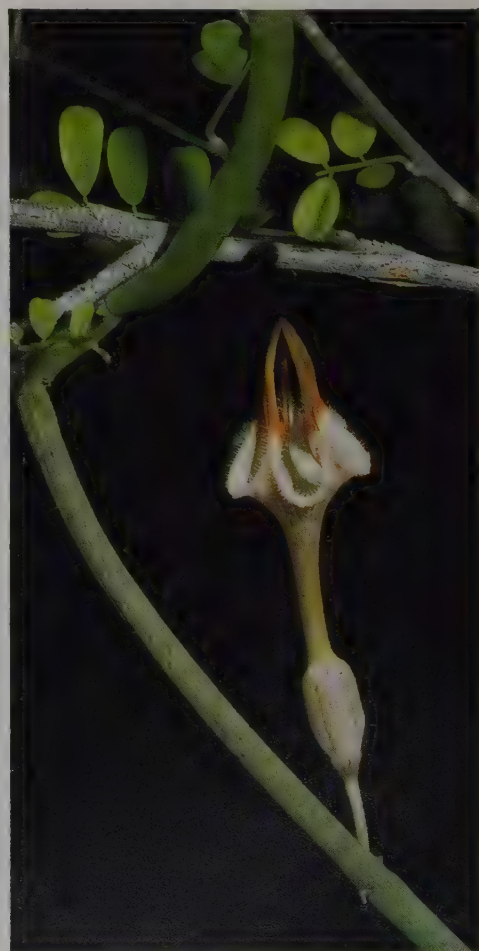
A leafless green slender-stemmed twiner with branching stems 2 m long; flowers wide opening, 3 cm long and 2 cm wide, the corolla creamy with pale green longitudinal lines, the yellow lobes narrow and strongly reflexed along their margins; the inside is white with short white hairs; no scent. Locally fairly abundant.

Jabal Fayfa, 100 km NE of Jizan; among scrub on a steep rocky hillside. 5,200 ft.

***Ceropegia* sp. 3281 ◆**

A leafless twiner with slender green stems 2 m long with grey blotches; creamy flowers 6 cm long with pale green markings, the corolla lobes greenish shading to chestnut at the base, joined at the tip and fringed with short white hairs; no scent; white sausage-like roots.

Jabal Fayfa, 100 km NE of Jizan; twining up an *Abrus bottae* bush on a steep rocky scrub-covered hillside. 5,200 ft.





***Ceropegia* sp. 3324 A** ◆

A green fairly stout many-branched twiner with stems to 3 m long; pinkish-cream flowers 4.2 cm long with greyish markings, the yellowish lobes joined at the tip; white fusiform (sausage) roots.

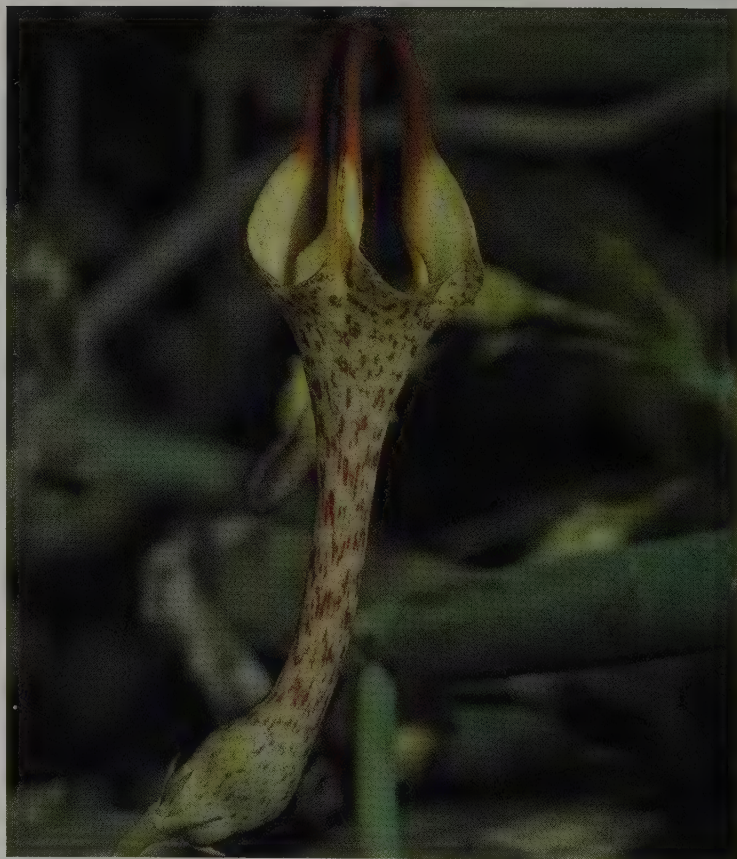
Wadi al Uss, NW of Jabal Sawdah, near Abha, 13 km below the Police Post; growing among *Euphorbia* sp. aff. *schimperi* bushes. 3,000 ft.



***Ceropegia* sp. 3326** ◆ ◆

A green fairly stout many-branched twiner with stems 3 m or more long; glabrous creamy flowers 4 cm long and 1.3 cm wide, the greenish lobes shading to brown at the joined tips; fibrous roots; large leaves. There are sometimes a few white hairs on the lobes.

Wadi al Uss, NW of Jabal Sawdah, near Abha, 10 km below the Police Post; growing among dense *Anisotes* and *Euphorbia* bushes. 5,300 ft.



◆ ***Ceropegia* sp. 3329**

A green fairly stout many branched twiner with stems to 3 m long; pinkish green flowers 4 cm long with relatively long brownish-veined lobes joined at the tip; fibrous roots; large leaves.

Wadi al Uss, NW of Jabal Sawdah, near Abha, 10 km below the Police Post; growing among dense *Anisotes* and *Euphorbia* bushes. 5,300 ft.



***Ceropegia* sp. 3603** ◆◆

A leafless twiner with greenish grey stems several metres long; stout creamy flowers 3.8 cm long with reddish markings, the short orange corolla lobes 8 mm long joined at the tip and fringed with short white hairs.

Jabal Fayfa, 100 km NE of Jizan; among shrubs on a densely vegetated steep rocky hillside. 5,200 ft.



Cynanchum tetrapterum ◆

A leafless green slender-stemmed twiner with branching stems 3 m long; bright green corolla 5 mm wide with strongly reflexed lobes and white corona; no scent.

Jabal Fayfa, 100 km NE of Jizan; among scrub on a steep rocky hillside. 5,200 ft.



Dregea schimperi ◆

A tangled leafy vine with stems to 5 m long and large cordate leaves; white flowers 8 mm wide, in heads, the corolla lobes slightly twisted; very strong sweet scent.

50 km south of Baljurshi, Taif-Abha road; climbing over *Euclea schimperi* on well-wooded rocky granite hillside. 6,500 ft.



Duvalia sulcata ♀ ♂

A mottled grey-green four-angled succulent with long soft teeth and ascending stems 5 cm long; pale red flowers 2.5 cm wide on short pedicels, the corolla lobes fringed with long red and white hairs and with a white hairy annulus; no scent. Very variable; one population has a much larger, five-angled cream-coloured outer corona and deep red more pointed corolla lobes.

Grandi Lavori road, 25 km from its junction with the Jiddah-Jizan road; under a bush on a gently sloping rocky hillside. 2,500 ft.



◆ ***Duvalia sulcata* var. *semi-nuda***

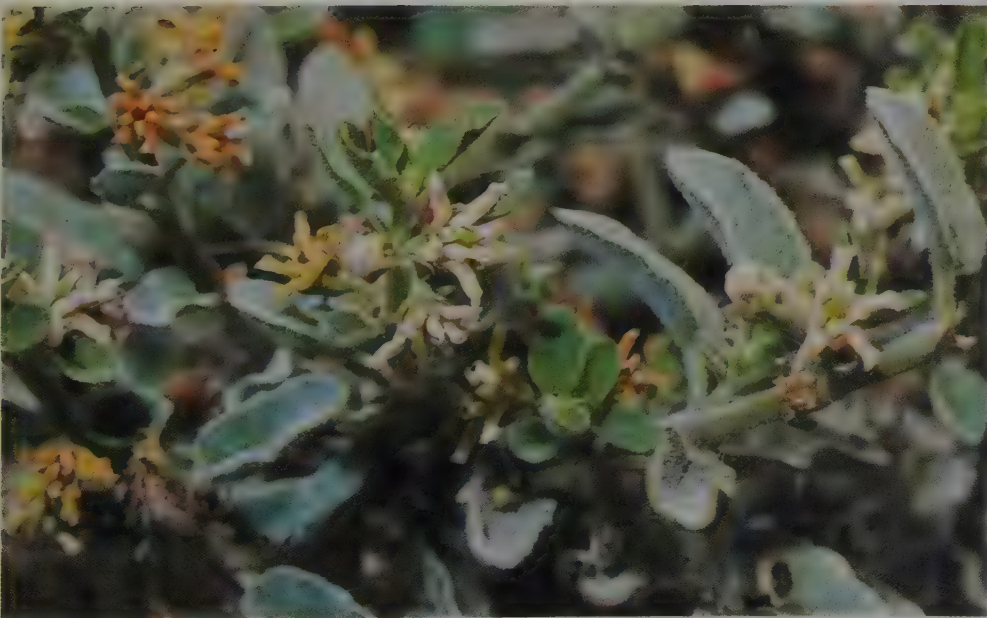
A mottled grey-green four-angled succulent with long soft teeth and ascending stems 5 cm long; shiny bright brownish-red flowers 2.5 cm wide on short pedicels, the corolla lobes fringed with either red or white hairs; the annulus is glabrous; no scent. Fairly widespread in the southern foothills.

12 km north of Muhayl, Jiddah-Jizan road; at the base of an acacia, on stony ground. 1,200 ft.

Duvalia velutina ◀ ▶

A mottled grey-green four-angled succulent with long soft teeth and ascending stems 5 cm long; pale greenish red flowers 2 cm wide on long pedicels, the corolla entirely covered with short soft hairs; no scent. The most widespread species in the southern lowlands. Variable.

Near Abu Arish, east of Jizan; in hard sand under the shade of bushes. 500 ft.



▶ ***Glossonema boveanum*** ◀

A leafy branching herb 10 cm high; pale pink flowers 4 mm wide; sour smell; relatively large soft-spiny fruits, pale green streaked with brown. A widespread plant. Variable; the flowers can be up to 1 cm wide.

Low rocky hills, 10 km east of Jiddah; in hard sand. 80 ft.



Glossonema edule ♣

A spreading leafy herb forming a clump 30 cm wide; reddish-brown flowers 6mm wide with a creamy corona; sour smell; very milky juice.

Near Jabal Manfah, 58 km NNW of Najran; in gravel by the roadside. 6,200 ft.

Gomphocarpus sinaicus ♦

A bushy shrublet 60 cm high with narrow mealy leaves; very pale green flowers 8 mm wide with white corona; sour smell. Very widespread though never very abundant.

4 km north of Shiqri, on the road to Tabuk; in hard sand. 3,000 ft.

Gomphocarpus fruticosus ♣

A slender shrublet 2 m high with long narrow leaves; pale greenish yellow flowers 8 mm wide with brown corona; no scent.

Wadi Habaqah, 31 km south of Baljurshi, Taif-Abha road; among shrubs near a stream. 6,100 ft.





***Huernia* sp. nov. aff. *boleana* ◆**

A mottled red and grey-green succulent with crowded five-angled soft-toothed stems to 7 cm high; campanulate flowers 4 cm wide with slender corolla lobes and short hair-like papillae, creamy white with fine broken horizontal lines and dark purple centre; foul smell. Widespread in scattered localities in the Asir.

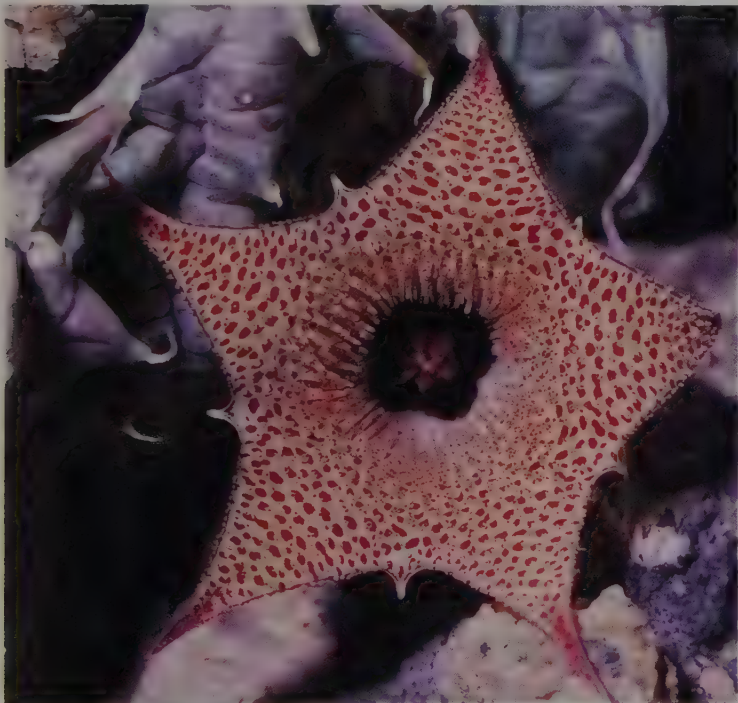
Near Wadi Wejj, 25 km SW of Taif; among rocks on a rather barren hillside. 6,000 ft.



***Huernia* sp. 643 ◆ ◆**

A mottled grey-green succulent with five-angled soft-toothed stems 6 cm high; shallow campanulate flowers 2.8 cm, wide with very reflexed lobes, dark purplish black including the stubby papillae; no scent. Sometimes the flowers remain half open, and in some colonies the papillae are pale red at the base.

The waterfall beauty-spot between Abha and Jabal Sawdah; among rocks and scattered shrubs on a steep hillside. 8,500 ft.



***Huernia lodarensis* ◆**

A mottled lilac and grey-green succulent with five-angled soft-toothed stems 6 cm high; shallow campanulate flowers 3.2 cm wide with blunt slightly reflexed lobes, greenish yellow heavily freckled with dark crimson; broken blackish lines in the throat and an almost solid dark purple centre; faint smell. This is the smallest-flowered *Huernia* found as the lobes are not very reflexed.

Near Jabal Manfah, 50 km NNW of Najran; in crevices among large tumbled granite boulders. 6,200 ft.





***Huernia saudi-arabica* ◆**

A mottled red and grey-green succulent with crowded five-angled soft-toothed stems 5 cm high; deep crimson shallow campanulate flowers 4.5 cm wide with golden papillae and recurved lobes; fine gold lines towards the base of the corolla, which has a dark purple centre; faint unpleasant smell. Fairly widespread around Abha.

The waterfall beauty-spot between Abha and Jabal Sawdah; among scattered vegetation and rocks on a steep hillside. 8,500 ft.



***Huernia* sp. 3743 ◆**

A mottled grey-green succulent with five-angled soft-toothed stems 10 cm high; white campanulate flowers 4 cm wide, the lobes slightly reflexed, spotted with red and with speckled papillae; strong foul smell.

Jabal Fayfa, 100 km NE of Jizan; on rather barren scrub-covered hillside, in shelter of small bushes and grasses. 5,000 ft.



***Huernia* sp. 1176 ◆**

A mottled red and grey-green succulent with crowded five-angled soft-toothed stems 8 cm high; pale creamy-white campanulate flowers 5 cm wide with very long slender slightly recurved corolla lobes speckled with crimson, the gold papillae dotted with purple; fine horizontal crimson lines toward the base of the corolla, which has a dark purple centre; faint unpleasant smell. This species has so far been found only here and near Taif.

The waterfall beauty-spot between Abha and Jabal Sawdah; among bushes on a steep rocky hillside. 8,500 ft.



***Kanahia laniflora* ◆**

A densely leafy herb 1 m tall branching from the base; white hairy flowers 1.2 cm wide; sour smell. In scattered localities, near water.

Najran, near the New Dam; among rocks at the edge of the stream. 4,500 ft.



Leptadenia arborea ♀ ♂

A tangled leafy vine with stems 6 m long and usually rounded but sometimes long narrow leaves; creamy flowers 5 mm wide, in heads; sweet scent. Large fruits over 8 cm long.

Near Suq Ayban, Jabal Fayfa, 100 km NE of Jizan; climbing over a tamarisk in the dry river bed. 1,500 ft.



Leptadenia pyrotechnica ♀ ♂

An erect bushy leafless green-stemmed shrub 2 m high; greenish yellow flowers 7 mm wide, in bunches at intervals along the stems; very sweet scent. A very widespread plant from sea level to 4,000 ft. Frequently grazed.

5 km east of Jiddah; in hard sand. 50 ft.





Odontanthera radians ▲

A leafy herb 7 cm high with large heart-shaped dark green downy leaves having pale silvery veins; narrow flowers 5 mm wide with twisted corolla lobes, lilac outside and yellow inside; no scent. Widespread in hard sand especially in the lowlands.

8 km east of Jiddah; in hard sand. 50 ft.



Pentatropis spiralis ▲

A slender vine with stems 3 m long and narrow heart-shaped leaves; pale greenish flowers 1.5 cm wide with narrow twisted corolla lobes; no scent. Very widespread, with leaf size and shape variable; the flowers open before dawn and wilt by 9 am.

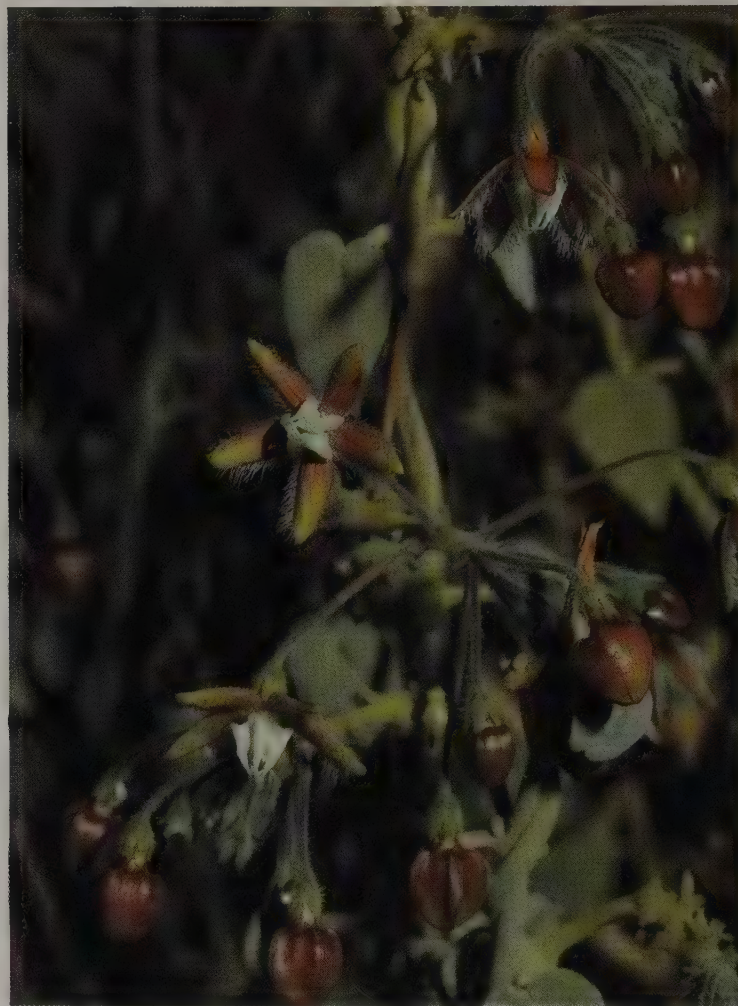
At Kilometre 100 on the Makkah By-Pass; among acacias. 1,000 ft.



Pergularia daemia ▲

A tangled leafy branching vine with stems 5 m long and large glossy heart-shaped leaves; pale greenish yellow flowers 2 cm wide, the lobes fringed with white hairs; no scent. Fairly widespread in the southern hills.

Jabal Manfah, 50 km NNW of Najran; climbing over an acacia in a wide sandy wadi. 6,200 ft.



Pergularia tomentosa ▲

An erect woody-based herb 1 m high with greyish heart-shaped leaves and the young stems frequently self-twining; pale reddish flowers 1.5 cm wide, the lobes fringed with white hairs; sour smell. A very widespread plant.

Near Jabal Harb, 78 km SW of Tabuk; among granite boulders. 4,000 ft.



Periploca aphylla ◆

An erect leafless green-stemmed shrub 1.5 m high; pale purplish flowers 2 cm wide, the corolla lobes fringed with white hairs; white corona; no scent. A very widespread plant, often grazed.

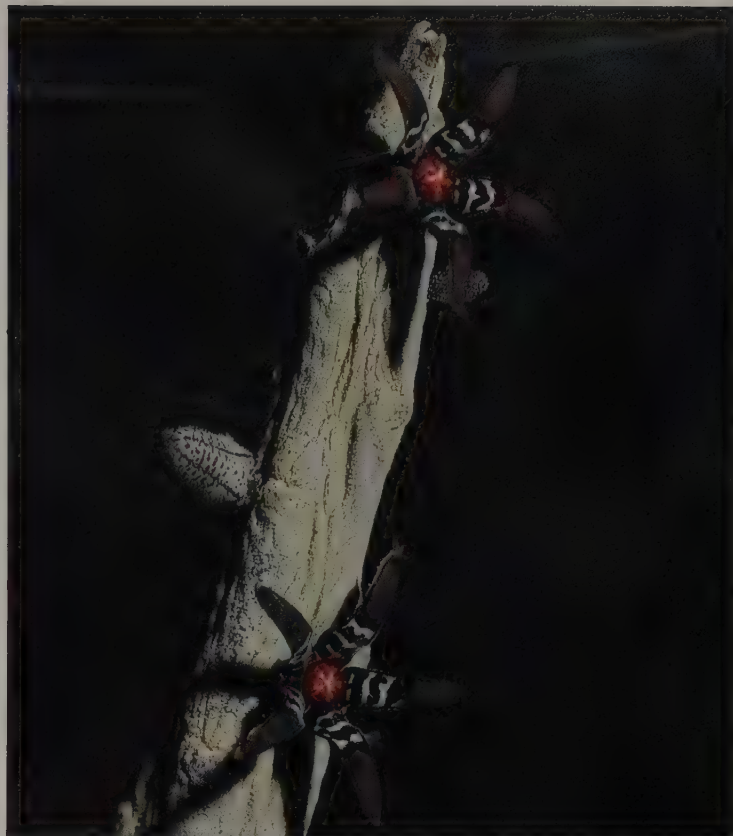
48 km south of Baljurshi, Taif-Abha road; on a rocky hillside among acacias. 6,500 ft.



◆ ***Periploca* sp. nov. aff. *laevigata***

A tangled leafy vine with stems 4 m long and long narrow leaves; greenish yellow flowers 7 mm wide; sweet scent; very milky juice. Widespread in the juniper zone of the southern Asir.

Near Suq al Ithnayn, 58 km SE of Abha; climbing over junipers at the lip of the escarpment. 7,900 ft.



Rhytidocaulon macrolobum ◆

A single-stemmed wrinkled greyish succulent 25 cm long (grazed); black velvety flowers 1.5 cm wide, the corolla lobes with a few white flecks near the base and one or two red hairs at the apex; strong bad sweetish smell. The flowers are borne all around the stem. Size and colour of flower variable.

Grandi Lavori road, 21 km from its junction with Jiddah-Jizan road; in rocky sand, under acacias. 2,500 ft



Rhytidocaulon* sp. aff. *macrolobum ◆

A sparsely branching arching leafless succulent 60 cm high with wrinkled greyish stems; sessile flowers 5 mm wide, the corolla lobes black towards the apices, which have tufts of black hairs, the basal half of the lobes white with narrow transverse black stripes; pale yellow corona; no scent.

45 km south of Zahran, Abha-Najran road; in crevices of limestone outcrop. 6,000 ft.



***Rhytidocaulon sheilae* (sp. nov.)** ◆ ◆

A semi-prostrate sparsely branching succulent with wrinkled greyish stems 10 cm long; green flowers 8 mm wide borne on the underside of the stems; reddish corona; no scent. Very widespread around Muhayl, which is 100 km to the west of the type locality.

15 km SE of Khamis Mushayt; in a hollow of a low granite outcrop. 6,000 ft.





***Sarcostemma* sp. 3118** ♀

A free-standing leafless succulent with crowded pencil-thick pale green stems 1 m long which form bushes 1 m wide; flowers 6 mm wide, in large bushy heads, pale green with a white corona; sweet scent; milky sap. This is similar to 814 except for the large heads of flowers, which are as much as 6 cm wide. The stems sometimes root at the tip. Locally abundant.

A granite hill, 83 km ESE of Al Bahah; among large boulders. 5,500 ft.



♣ ***Sarcostemma* sp. 814** ♀

A free-standing leafless succulent sometimes pendent, with pencil-thick green stems 1 m long; greenish-yellow flowers 9 mm wide with white corona, usually opening in pairs; sweet scent; milky sap. Fairly widespread at high altitudes in the Asir.

About 10 km south of Abha; on the steep lip of the escarpment; very barren. 8,500 ft.



♣ ***Sarcostemma* sp. aff. *viminale***

A tangled bright green slender-stemmed twiner with stems 3 m long that because of activity by thrips make a tight corkscrew at intervals; creamy flowers 1 cm wide, with white corona, in heads; sweet scent; milky sap. This species is nearest to the type. *Sarcostemma viminale* is a variable species whose limits are imprecisely delineated, but the type is a slender-stemmed twiner with an unbranched base and flowers in few-flowered umbels.

Jabal Fayfa, 100 km NE of Jizan; among shrubs on a steep rocky hillside. 5,200 ft.

♣ ***Sarcostemma* sp. 1977**

A many-branched leafless succulent with fairly stout grey-green stems 3 m long forming a dense thicket; creamy-white flowers 8 mm wide, in spherical heads; sweet scent; milky sap. Very widespread in the southern lowlands at around 1,000 ft.

Near the escarpment, Taif-Jiddah road; climbing through an acacia in a rocky wadi. 1,500 ft.



◆ *Solenostemma oleifolium* ◆◆

An erect bushy leafy shrub 1 m high branching from the base and with leathery bluish leaves; greenish white flowers 1 cm wide with prominent greyish corona, in rounded heads; spicy scent; large drop-

shaped pale green woody fruits striped with purple.

Near Ash Sharmah, south of the Gulf of Aqaba; in hard sand among low hills. 2,000 ft.



BARBEYACEAE

Some authorities include the genus *Barbeya* in the family Ulmaceae and a single species is found in Arabia. *B. oleoides* is unisexual with inconspicuous greenish flowers; the male plant can be mistaken for the olive, which occasionally grows in the same locality.

◆ ***Barbeya oleoides***

A bushy shrub or small tree up to 5 m high with olive-like leaves. The female flowers 3 cm wide are in dense panicles, each consisting of three or four pale yellowish green sepals, surrounding a small pointed oval ovary; no scent. Male flowers are creamy, 5 mm wide; no scent.

55 km south of Baljurshi, between Taif and Abha; near the lip of the escarpment. 7,000 ft.



Barbeya oleoides; female flowers ◆



BORAGINACEAE

With 42 species found so far by the author in Saudi Arabia this is only an average sized family, but after rains certain heliotropes can carpet the ground for miles. The two *Echiochilon* species are small shrublets but most of the species are annual herbs, covered to a greater or lesser extent with the rough hairs typical of the family. The three species of *Cordia* and the *Ehretia* are shrubby trees, which some authorities place

in the separate family Ehretiaceae. The flowers of most of the herbs are usually arranged on a scorpioid cyme, which uncoils progressively as the flowers open; this is particularly noticeable on *Heliotropium*. The *Trichodesma* species can lead a novice into thinking they belong to the genus *Solanum*. In spite of the rough hairs, most species are readily grazed.



Alkanna orientalis ◆

A bushy leafy herb 30 cm high; yellow flowers 9 mm wide; no scent.

A watered valley in the Jabal Ash Shati range, 30 km NE of Ash Sharmah; in pink granite sand. 4,000 ft.



Anchusa affinis ◆

A stiffly erect branching hairy herb 50 cm high with pale spots on the leaves; brilliant deep blue flowers 1.2 cm wide; no scent. A new record for Saudi Arabia.

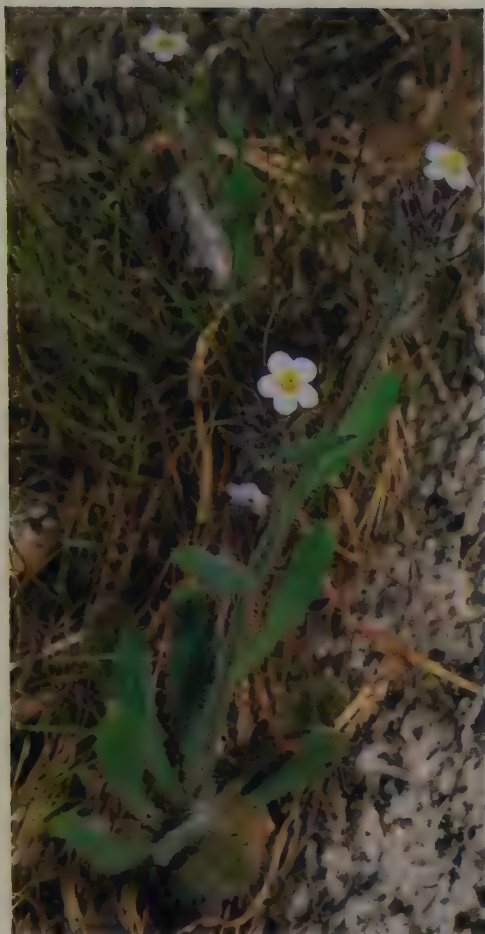
20 km south of Baljurshi, on the Taif-Abha road; on a grassy bank bordering wheatfields. 6,000 ft.



◆ ***Anchusa aegyptiaca***

A leafy herb with ascending stems 20 cm long; pale pink flowers 1 cm wide.

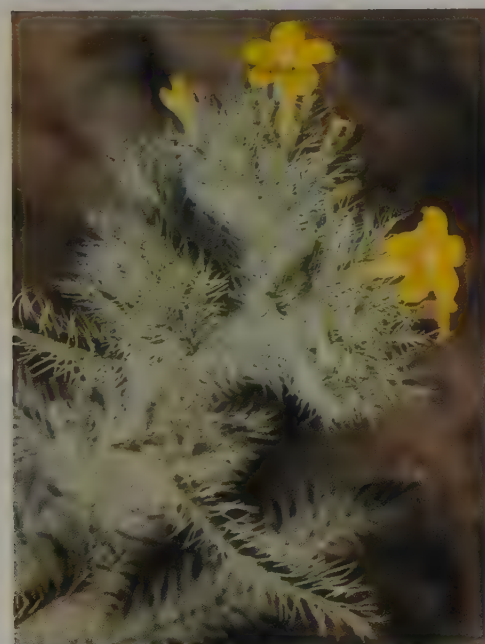
Halfway up the escarpment, Jiddah-Taif road; at the base of a cliff by the roadside. 4,000 ft.



Anchusa milleri ♣

A spreading leafy herb with stems 8 cm long and hairy leaves with pale raised warts; pale rose-pink flowers 5 mm wide.

A watered valley in the Jabal Ash Shati range, 30 km NE of Ash Sharmah; in damp granite sand. 4,000 ft.



Arnebia hispidissima ♣

A densely white-hairy small herb 12 cm high; bright yellow flowers 4 mm wide; no scent. A widespread plant.

Low rocky hills, 10 km east of Jiddah; in hard sand. 80 ft.



Arnebia decumbens ♣

A narrow-leaved herb 8 cm high; bright yellow flowers 2 mm wide; no scent. The arching stems elongate as the plant ages and the flowers are borne in a V-shaped line along

the upper side. A widespread herb in the north.

5 km east of Shiqri, on the road to Tabuk; in a rocky wadi. 3,000 ft.



Arnebia tetragynia ♣

An erect bushy herb 10 cm tall with greyish soft-hairy leaves; lilac flowers 3 mm wide; no scent. Very red root, giving a long-lasting stain.

Tabajal Camp, 30° 07'N, 37° 50'E; in a sandy runnel on weathered basalt hillside. 2,050 ft.



Asperugo procumbens ♀

A leafy stiff-hairy herb with weak stems to 75 cm long; bright blue flowers 3 mm wide; non-aromatic; large winged fruits.

Near Jabal Ibrahim, off the Taif-Al Bahah road; under shady acacias in a wide grassy valley. 7,000 ft.



Buglossoides arvensis ♀

A delicate narrow-leaved herb 12 cm high; tiny white flowers 1.5 mm wide, in the leaf-axils at the top of the stem; no scent.

A red granite mountain, 45 km south of Baljurshi, on the Taif-Abha road; in light shade on a well-vegetated rocky hillside. 6,500 ft.

Brandella erythraea ♀

A slender erect leafy herb 45 cm tall; pale blue flowers 4 mm wide; no scent. Locally widespread.

A red granite mountain, 45 km south of Baljurshi, on the Taif-Abha road; in light shade on a well-vegetated rocky hillside. 6,500 ft.



Cordia africana ♀

A leafy tree 7 m tall, the young stems and large cordate leaves brown-hairy; white flowers 3 cm wide, in large clusters; the fallen corollas have no scent.

Jabal Fayfa, 100 km NE of Jizari; in shade, on steep rocky well-vegetated hillside. 5,000 ft.





Cordia ovalis ▲ ◆

A dense dark-leaved shrubby tree 5 m high; creamy flowers 5 mm wide; sweet scent; bright yellow fruits 2 cm long by 1 cm wide.

Near the base of the escarpment, Grandi Lavori road, 5 km south of Baljurshi; among rocks in a dry wadi. 3,000 ft.



Cordia sinensis ▲ ◆

A many-branched leafy shrub with arching stems to 2 m long; creamy-white flowers 5 mm wide; sweet scent; the fruits are oval orange drupes 1.2 cm long.

Wadi Halahila, 20 km north of the Police Post at Kilometre 40, NNW of Najran; growing from a rock wall. 4,500 ft.



Cynoglossum lanceolatum ◆

An erect leafy herb 25 cm tall with horizontal branches from the main stem and narrow hairy leaves; pale blue flowers 3 mm wide with darker centre.

Jabal Fayfa, 100 km NE of Jizan; on rocky shrub-covered hillside. 5,300 ft.

***Cynoglossum bottae*** ◆

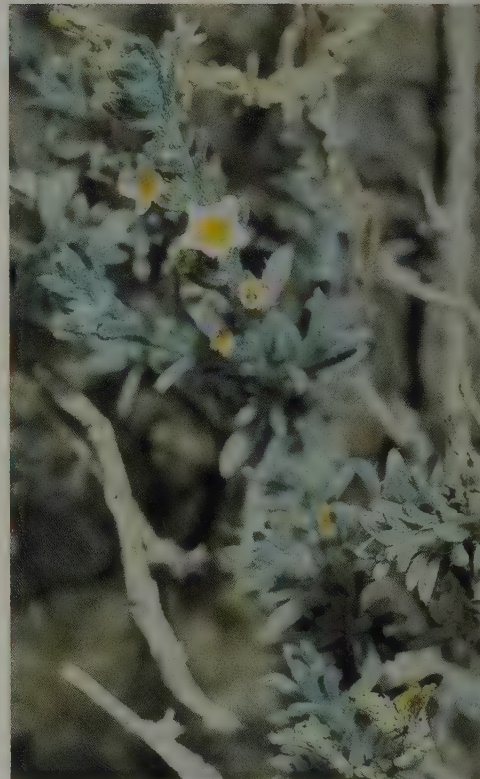
A branching annual herb 45 cm high; pale blue flowers 5 mm wide with a dark blue centre, in terminal spikes; no scent.

Near the waterfall between Abha and Jabal Sawdah; in damp ground near the stream. 8,300 ft.

***Echiochilon fruticosum*** ◆

A densely twiggy bush 30 cm high with green narrow-leaved new shoots; lilac buds opening to blue flowers 5 mm wide; no scent.

10 km north of Shiqri, on the Tabuk road; among red sandstone buttes, on the crest of a small sand dune. 3,500 ft.

***Echiochilon* sp.** ◆

A bushy shrublet 15 cm high with narrow grey-green hairy leaves; pale yellow flowers 3 mm wide; no scent.

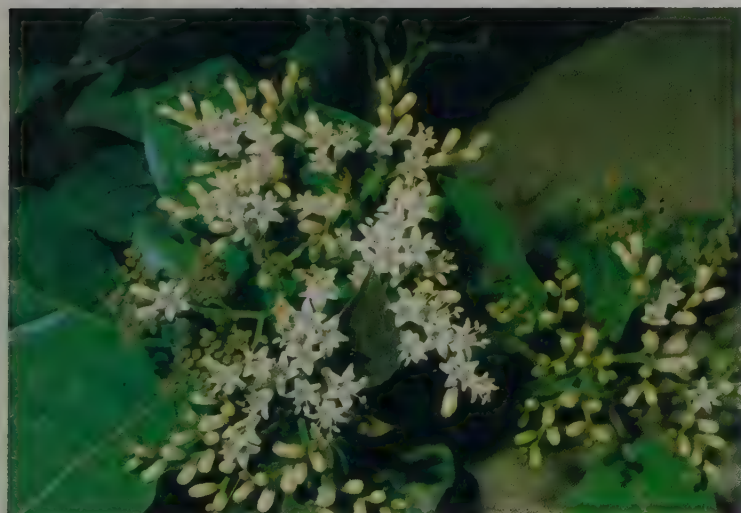
Near the Police Post, Jabal Manfah, 45 km NNW of Najran; among round black granite boulders. 6,200 ft.



Echium longifolium ◆

A very hairy branching herb, 30 cm high and 50 cm wide, with warty leaves; deep pink flowers 7 mm wide that age lilac-blue; no scent. A very widespread plant.

Near the airport, Abha; in hard sand by the roadside. 7,000 ft.



Ehretia cymosa ◆

A straggly shrubby tree 3 m tall; white flowers 1.2 cm wide, in flat heads; sour smell; globular orange berries 6 mm wide.

Jabal Fayfa, 100 km NE of Jizan; on a steep rocky hillside. 5,300 ft.



Gastrocotyle hispida ◆

A semi-prostrate leafy herb with coarse prickly hairs and arching stems to 35 cm long; the pale blue flowers, 2 mm wide, are borne on the underside of the stems. Fairly widespread.

Near Uqlat as Suqur, on the Madinah-Qassim road; in hard sand among rocks. 2,800 ft.



Heliotropium arbainense ◆

A densely leafy bushy herb 35 cm high; pale cream flowers 5 mm wide, aging deep yellow; strongly aromatic.

Wadi Fatimah, 15 km SE of Jumum; in hard sand. 600 ft.



◆ ***Heliotropium curassavicum***

A very leafy herb with ascending stems to 30 cm long and blue-green glaucous leaves; white flowers 3 mm wide, in spikes to 9 cm long.

Near the sewage works, 10 km south of Jiddah; on the bank of a salt-water lagoon. 2 ft.



◆ ***Heliotropium dolosum***

A branching leafy herb to 60 cm high; relatively large white flowers 4 mm wide, in long curved heads; non-aromatic.

Near Jabal Mershid, 40 km east of Qunfudhah; in firm sand. 80 ft.



◆ ***Heliotropium lasiocarpum***

A very leafy branching herb 60 cm high; tiny white flowers 1 mm wide buried in white 'wool', in curved spikes; no scent.

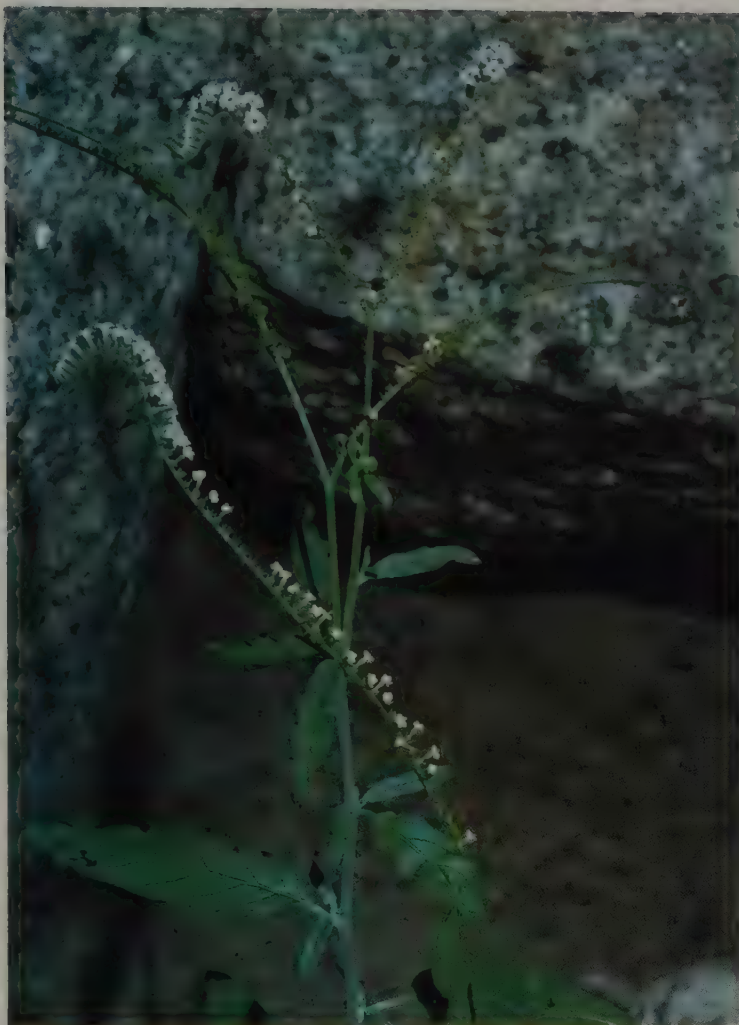
Along the perimeter fence of the New Airport, Jiddah; on the edge of an irrigated shelter belt. 20 ft.

◆ ***Heliotropium digynum***

A white-stemmed twiggy perennial shrub 25 cm high; tiny creamy-yellow flowers 3 mm wide, in almost spherical heads; no scent.

Among sandstone buttes 14 km east of Shiqri, on the road to Tabuk; in drifted sand. 3,000 ft.





Heliotropium longiflorum ◆

A branching herb 25 cm high; tiny white flowers 3 mm wide, in long terminal spikes; no scent. Fairly widespread.

Halfway down the escarpment, Abha-Jizan road; among rocks. 5,000 ft.



Heliotropium ramosissimum ◆

A bushy leafy woody-based herb 30 cm high; white flowers 3 mm wide; non-aromatic. Widespread in the north.

Aban al Ahmar, a granite massif 143 km SW of Buraydah; on the rocky summit. 4,200 ft.



Heliotropium pterocarpum ◆

A spreading semi-prostrate very hairy annual herb; white flowers 3 mm wide; no scent. Widespread in the lowlands around Jiddah.

Low rocky hills, 10 km east of Jiddah; in hard sand. 80 ft.



Heliotropium rariflorum ◆

A slender-branched bushy shrubby herb 60 cm high with very brittle yellowish stems, narrow leaves, and a musty aroma; tiny white flowers 1 mm wide.

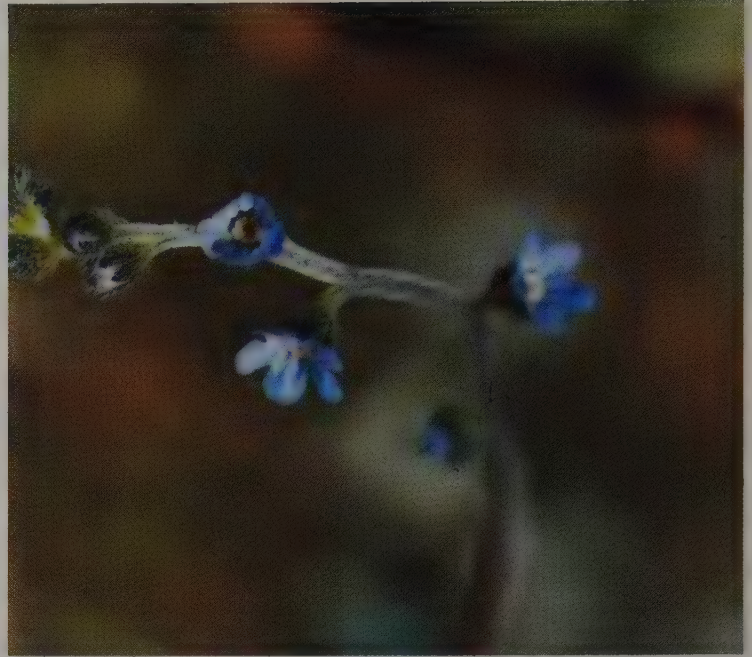
Wadi Halahila, 20 km north of the Police Post, 40 km NW of Najran on the Abha road; in a steep rocky ravine. 4,500 ft.



Heliotropium strigosum ◆

A small spreading semi-prostrate herb with stems 12 cm long; white flowers 3 mm wide; no scent. Fairly widespread in the south.

Ain Zubaydah, 1 km SE of junction of Makkah By-Pass with Taif road; in hard sand. 1,300 ft.



Lappula sinaica ◆

A slender herb 12 cm high; bright blue flowers 4 mm wide; no scent.

Jabal Dabbagh, a 7,500 ft. granite massif 88 km SW of Tabuk; on a northwestern spur. 5,500 ft.



Hormuzakia aggregata ◆

A leafy branching herb with stems 35 cm long; bright blue flowers 5 mm wide. This plant is very similar to *Anchusa arvensis* ssp. *orientalis*.

On the slope of Jabal Tamiyah, SW of Uqlat as Suqur off the Madinah-Qassim road; among rocks on a steep slope. 3,000 ft.

◆ ***Heliotropium subulatum***

A many-branched wide bushy herb 1 m high; spidery greenish-yellow flowers 5 mm wide, in long terminal spikes; no scent.

One-third of the way up the escarpment, Jiddah-Taif road; on a steep rocky hillside. 4,200 ft.



Lappula spinocarpus ◆

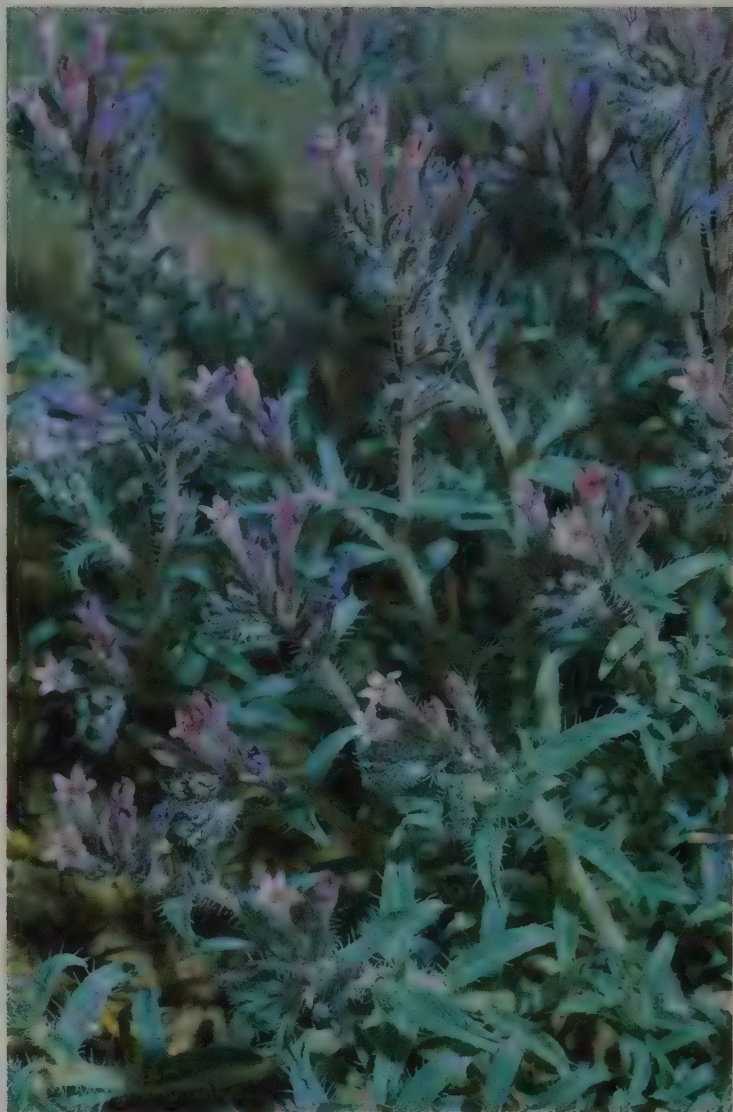
A small bushy leafy herb 8 cm high; tiny white flowers 2 mm wide; no scent; large spiny ripe fruits. Fairly widespread in the north.

5 km east of Shiqri, on the road to Tabuk; in a shallow depression in red sand. 3,000 ft.

Moltkiopsis ciliata ◆◆

A semi-prostrate very coarse-hairy herb with stems 10 cm long; pale pink flowers 5 mm wide; no scent.

10 km north of Shiqri, on the way to Tabuk; among sandstone buttes, in drifted red sand. 3,000 ft.





Myosotis ramosissima ▲

A leafy herb with slender arching stems to 25 cm long; bright sky-blue flowers 2 mm wide; small narrow fruits enclosed in calyx.

Between Jabal Ibrahim and Suq ar Rubu; in shade of junipers among granite boulders. 6,800 ft.



Ogastemma pusillum ▲

A tufted herb with small narrow hairy leaves 17 cm high; tiny white flowers 1.5 mm wide. A very similar plant to *Lappula spinocarpos*, but the ripe fruits are not spiny.

Near Zabirah, 200 km north of Buraydah; in a claypan. 1,800 ft.



Paracaryum intermedium ▲

A small hairy leafy herb; deep blue flowers 3 mm wide with white centre; no scent.

A watered valley in the Jabal Ash Shati range, 30 km NE of Ash Sharmah; by a stream, in pink granite sand. 4,000 ft.



Paracaryum* cf. *rugulosum ◆

A downy erect herb to 30 cm tall with long narrow greyish leaves and the tip of the flower stem nodding; deep crimson flowers 3 mm wide; no scent; fleshy pale red fruits.

30 km west of Turayf Camp (31° 40'N, 39° 29'E); in drifted sand among small shrubs in a runnel on a limestone plateau. 2,900 ft.



Trichodesma africanum ◆

A branching hairy leafy herb 35 cm high; pale lilac flowers 6 mm wide with yellow centre; no scent. Fairly widespread in the north.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; among rocks. 2,000 ft.



Trichodesma ehrenbergii ◆

A very bushy leafy herb 60 cm high, densely soft-hairy; pale blue flowers 7 mm wide with yellowish centre; no scent. Fairly widespread in the south.

Near Hot Springs, Ain Markub, between Makkah and Al Lith; on a stony hillside. 800 ft.

Trichodesma calathiforme ◆

A stout branching downy-leaved herb nearly 1 m high; white flowers 1.5 cm wide with a golden-brown centre; no scent; the green calyx greatly enlarges in fruit. Fairly widespread in scattered localities south of Madinah.

Halfway down the escarpment, on the road between Taif and Jiddah; on a steep rocky hillside. 4,500 ft.



BURSERACEAE

All species of *Commiphora* contain resins, but whereas some have strongly aromatic foliage, some have no scent at all; many species have a peeling papery bark, but this is not much help in identification. The trees are frequently browsed, so that the distinctive slender drooping twigs that help to identify some

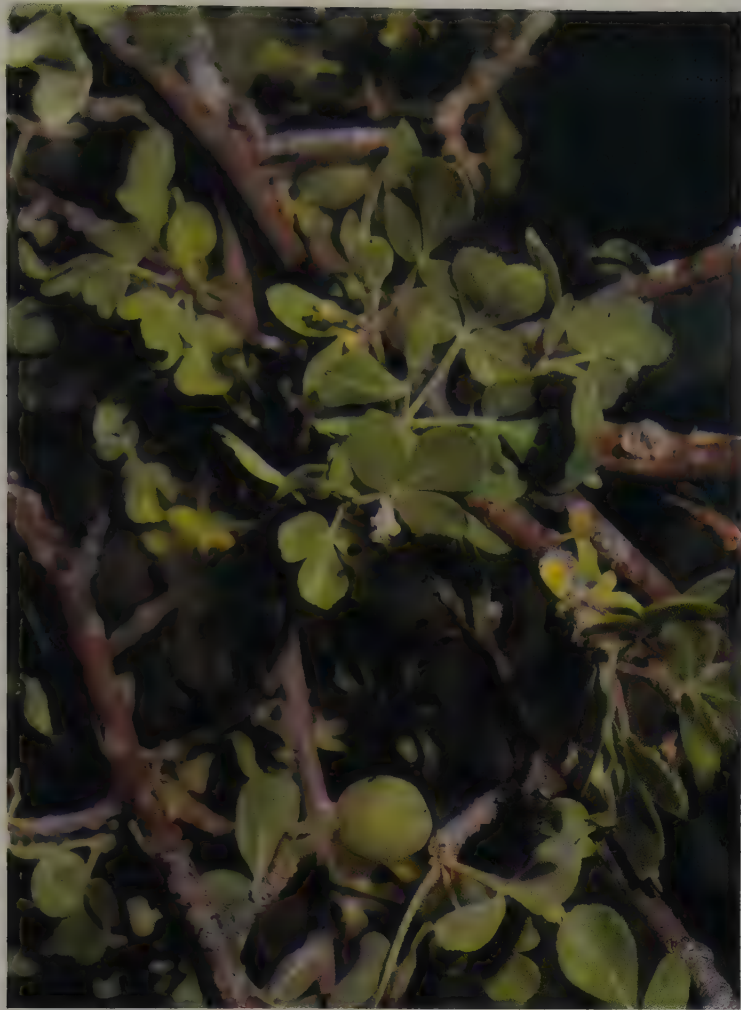
species are lost. A guide to identifying *C. quadricincta* is its distinctive four-part orange pseudo-aril under the skin of the fruit. The flowers are small, often unisexual, and on all the Arabian species are remarkably similar.



◆ ***Commiphora erythraea*** ◆

◆ A stout gnarled tree 4 m tall and 10 m wide, with creamy peeling bark, large hard trifoliate leaves and branches sweeping the ground; bright yellow flowers 4 mm wide on long stalks, in bunches; spicy scent; small pale green oval fruits with large orange pseudo-aril. Locally abundant, but not found on Farasan.

Dumsuk Island, Farasan group; in a shallow ravine in fossil coral. 20 ft.



Commiphora* sp. aff. *erythraea ◆

A stout-trunked tree 5 m tall with peeling papery bark and soft downy leaves; pale cream flowers 4 mm wide; almost spherical fruits 1 cm wide on long peduncles and with often two flowers to a stem; non-aromatic.

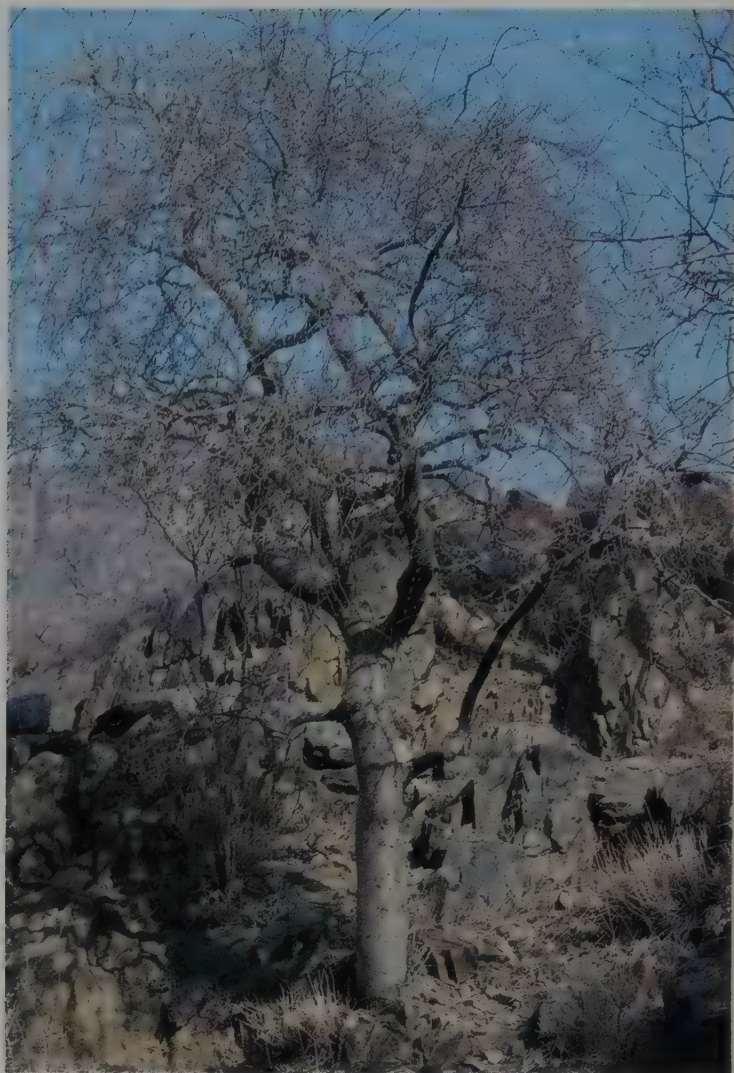
Grandi Lavori Road, 28 km from its junction with Jiddah-Jizan road; on a rocky plain. 2,500 ft.



Commiphora* sp. aff. *gileadensis ◆

A stout woody shrub 1.5 m high with glandular aromatic leaves; tiny creamy flowers 2 mm wide; small purple-flushed fruits.

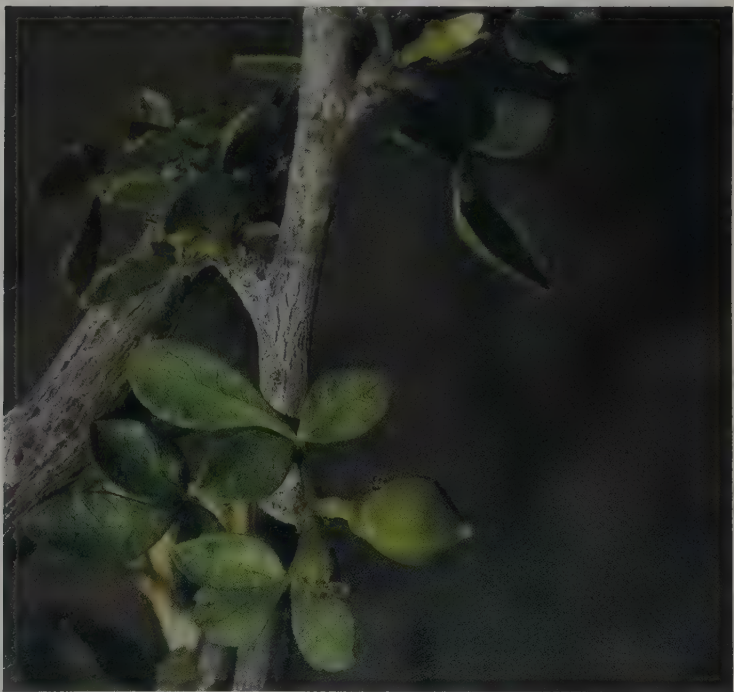
Low rocky hills, 10 km east of Jiddah; on a rocky hillside. 80 ft.



Commiphora gileadensis ◆◆

A fairly stout tree 5 m tall with slender drooping branches and glabrous trifoliolate leaves; red or white flowers 3 mm wide; strongly aromatic. Widespread south of Madinah.

Abha-Jizan road, near the Ad Darb junction; among acacias on a wide sandy plain. 500 ft.





◆ ***Commiphora kataf***

A single-trunked tree 7 m tall with creamy peeling bark and large trifoliate leaves having dentate margins and long petioles; creamy-pink flowers 5 mm wide, on long stalks; oval pink-flushed fruits; non-aromatic. Locally abundant.

Near the base of Jabal Fayfa, 100 km NE of Jizan; on rocky hillside. 2,000 ft.



◆ ***Commiphora kataf* forma vel. sp. aff. 3105**

A gnarled tree 2 m tall with peeling papery bark; flowers not seen; almost globular green fruits 1.2 cm long flushed with deep red and on long branching stalks; small trifoliate leaves, the centre leaflet much larger; non-aromatic.

A tonalite (granite) mountain, 83 km ESE of Al Bahah; among rocks near the summit. 5,500 ft.



◆ ***Commiphora kataf* forma vel. sp. aff. 2105**

A leafy stout-trunked tree 7 m high with pale peeling papery bark; the creamy flowers, 3 mm wide, are borne on long branching stalks; non-aromatic.

80 km SE of Qunfudhah; among rocky foothills. 300 ft.



◆ ***Commiphora madagascariensis* forma vel. sp. aff. 1466**

A slender tree 3 m high with peeling papery bark; red flushed green fruits; tiny tubular red flowers 1.5 mm wide; non-aromatic.

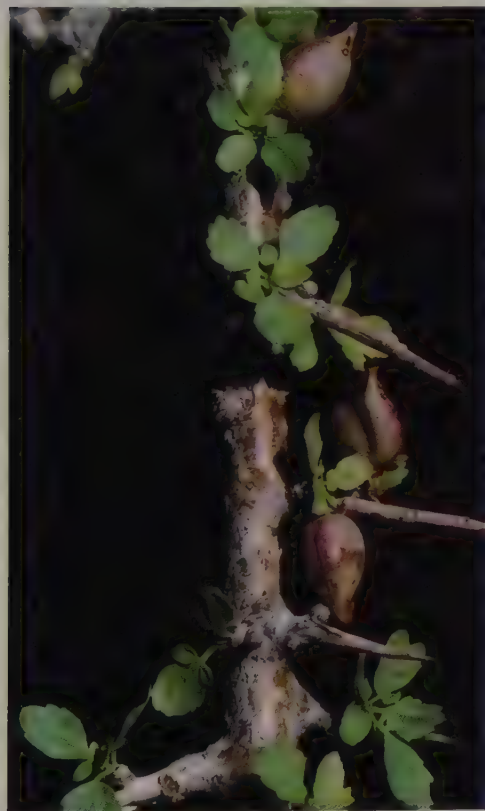
Wadi Halahila, 20 km north of Police Post at Kilometre 40, NNW of Najran; on a rocky hillside. 4,500 ft.



Commiphora madagascariensis forma vel. sp. aff. 3154 ◆

A stunted shrubby tree 2 m tall, sparsely spiny and with clusters of sessile leaves having dentate margins; flowers not seen; curved fruits with sharp apex, green flushed red; non-aromatic.

Jabal Fayfa, 100 km NE of Jizan; growing from road cutting on a dry hillside. 5,300 ft.



Commiphora myrrha ◆

A very bushy spiny tree 2 m tall with peeling papery bark and trifoliate leaves, the centre leaflet often larger and with dentate margin; flowers not seen; oval mango-shaped fruits 1.2 cm long; non-aromatic.

Wadi Kharar, near the foot of the escarpment, Jiddah-Taif road; in granite sand. 1,500 ft.



Commiphora sp. nov. aff. *myrrha* ◆

A stout spiny gnarled tree 2.5 m tall, with peeling papery bark and five foliolate leaves; reddish tubular flowers 5 mm long and 3 mm wide, with strongly reflexed corolla lobes, greenish yellow inside, in clusters; faintly aromatic; mango-like fruits, 1.7 cm long, that ooze a very sticky gum.

50 km east of Hamdah and north of Khamis Mushayt; among granite boulders. 4,000 ft.

Commiphora quadricincta ◆ ◆

A stout-trunked tree 2.5 m high with peeling papery bark; deep red flowers 3 mm wide; the long arching slender branches are slightly thorny, and the glabrous leaves are non-aromatic. Widespread, especially in the south.

35 km along the Al Lith road from the Makkah By-Pass; among low rocky hills. 100 ft.



CAMPANULACEAE

There are four well-recognized species in Saudi Arabia, growing mainly in the southern mountains, and there is a fifth one that is so distinctive that perhaps it deserves recognition; this is the white-throated open-campanulate form of *Campanula edulis*.

The *Campanula* species are frequently so tightly grazed that they form cushion plants and the brilliant blue species appear pinkish when photographed.



◆ ***Campanula dulcis***

A tangled leafy herb with stems to 20 cm long; pale blue-lilac flowers 1 cm wide, fading white, with the outside of the corolla white.

Halfway down the escarpment, Taif-Jiddah road; among rocks in a steep ravine. 4,500 ft.



◆ ***Campanula* sp. aff. *edulis*** ◆

The deep violet-blue flowers 1.5 cm wide have darker veins, a white centre and are of a wider bell-shape than *C. edulis*; no scent. Widespread around Abha.

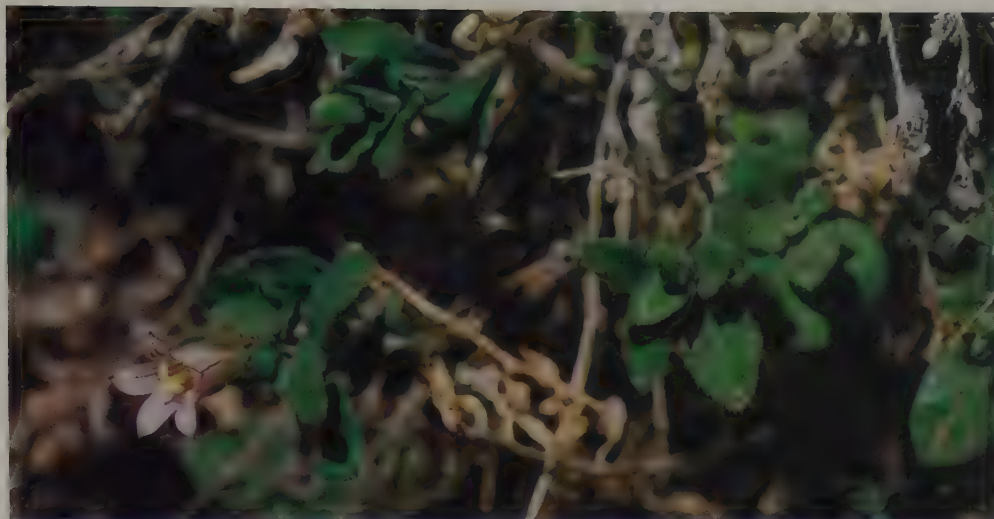
Near Suq al Ithnayn, 58 km SE of Abha; in the shelter of junipers. 8,000 ft.



◆ ***Campanula edulis***

A leafy herb, often grazed and forming a dense cushion; deep violet-blue flowers 1.5 cm wide; no scent. A very widespread plant in the southern mountains.

Near Al Bahah, on the Taif-Abha road; in hard sand among rocks. 6,300 ft.



***Campanula* sp. ♣**

A tufted cushion herb with stems to 10 cm long and with wide soft leaves; white flowers 6 mm wide with pink veins.

Jabal Warjan, 60 km SW of Madinah; on summit of a col, in a shady crevice. 6,800 ft.

***Wahlenbergia lobelioides* ♦**

A delicate-stemmed erect herb to 20 cm high with a leafy basal rosette and branching stems; white flowers 6 mm wide flushed with lilac; no scent.

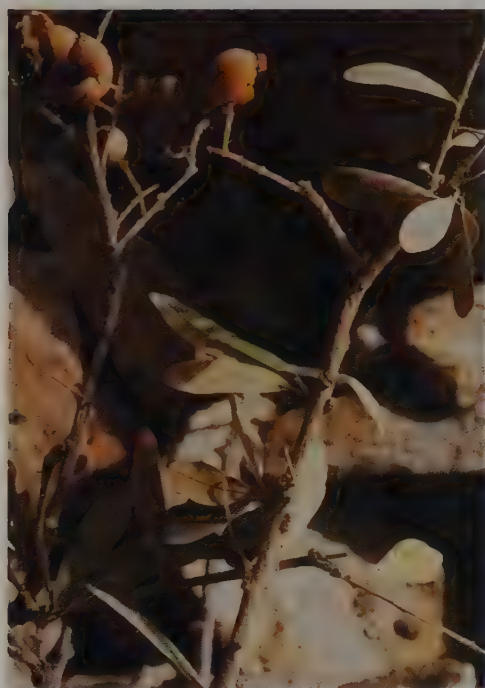
Red granite mountain 15 km SW of Al Hadda, off the Jiddah-Taif road; in damp sand among rocks in a shallow valley. 7,000 ft.



CAPPARACEAE

With 25 species this is a medium-sized family for Saudi Arabia. There is one large tree, *Boscia*, and with *Maerua crassifolia* often occurring as a tree; the other species are shrubs or herbs with most of the species of *Cleome* having aromatic foliage. *leome scaposa* and *Dipterygium glaucum* have characteristics in common with the Cruciferae and at one time some authorities placed the

latter species there. The two night flowering *Capparis*, *C. cartilaginea* and *C. spinosa*, have some of the largest flowers in the region; the buds of *C. spinosa* are the 'capers' of commerce, but there is no evidence that they are used locally to flavour food.



***Boscia angustifolia* ♣**

A stout silver-trunked tree 5 m high, suffering from drought; flowers not seen; remains of pale brown warty seed cases. This tree is common in Africa.

Wadi al Uss, on the western slope of Jabal Sawdah, 28 km NW of Abha; on a steep rocky hillside. 6,000 ft.



***Cadaba farinosa* ♣**

A bushy shrub 1.75 m high with small oval leaves; greenish yellow flowers 1.5 cm wide; no scent. A fairly widespread plant.

Between Khamis Mushayt and Najran, Wadi Halahila; growing from a cliff in a deep gorge. 4,500 ft.



Cadaba glandulosa ➤

A spreading leafy bush 1 m high with glandular aromatic foliage; the flowers have a single deep yellow 'petal' and hairy sepals. The ripe fruits split to reveal brilliant deep red inside.

Among low rocky hills, 10 km east of Jiddah; on a rocky hillside. 100 ft.



Cadaba longifolia ➤

A slender erect bush over 1 m high with narrow dark green leaves; pale greenish gold flowers 1.5 cm wide; no scent. The fruits split to reveal bright scarlet inside.

Among low rocky hills, 10 km east of Jiddah; on a rocky hillside. 80 ft.



Cadaba rotundifolia ➤

A leafy bush 1 m high with glabrous leaves; the flowers have a single bright yellow 'petal'; no scent. Fairly widespread on drifted sand in the lowlands south of Madinah.

On the coastal plain between Makkah By-Pass and Al Lith; among granite boulders. 200 ft.



Capparis cartilaginea ➤

A pendent bushy trailing shrub to 5 m long, with thick leathery leaves and small thorns; the large white flowers 6 cm wide open only at night; sweet scent. The large pear-shaped fruits turn orange when ripe and do not split open like *C. spinosa*. Found on steep cliffs almost anywhere down to the Yemen border.

Near the Gulf of Aqaba; among limestone hills. 3,500 ft.



Capparis decidua ◆

A wide dense, tangled and occasionally thorny leafless twiggly bush to 3 m high; light scarlet flowers 3 cm wide, one of the petals forming a hood; no scent. A very widespread shrub found from near the Gulf of Aqaba to the Yemen border.

Near Jiddah; among low sandy dunes. 50 ft.



Capparis tomentosa ◆

A tangled shrub with arching slender stems to 3 m long having soft downy leaves and pairs of hooked stipular thorns; pale creamy flowers 2 cm wide, the tufts of anthers forming spherical heads 4 cm wide; sweet scent. The general appearance of the shrub resembles *Salvadora persica*.

Wadi al Uss, NW of Jabal Sawdah, between the Police Post and Muhayl; on steep boulder cliffs bordering the wadi. 2,000 ft.

Capparis spinosa ◆

A spreading tangled thorny shrub 2 m wide with downy young stems and leaves; white flowers 5.5 cm wide with pinkish filaments; sweet scent. Night flowering. The ripe green oval fruits split into segments which curl back to reveal grey seeds embedded in pink flesh.

5 km NNW of Turayf Camp (31° 40'N, 39° 29'E); in claypan on limestone plateau. 2,900 ft.





Cleome amblyocarpa ◆

An erect bushy leafy herb 30 cm high with mainly trifoliate leaves; small brown and white flowers 4 mm wide; very aromatic. A very widespread plant, especially in the north.

Near Nabhaniyah, 100 km SW of Buraydah; in hard sand. 2,300 ft.



Cleome brachycarpa ◆

A bushy leafy herb 25 cm high with very aromatic short-hairy leaves; lemon-yellow flowers 1 cm wide. Fairly common in the lowlands around Jiddah.

Among low hills, east of Jiddah; in hard sand among rocks. 100 ft.



Cleome brachystyla ◆

A stout woody-stemmed bushy glandular-hairy herb 25 cm tall with almost orbicular five nerved leaves; in fruit; erect warty fruits with a deep groove along one side; aromatic.

Farasan Island, Khallah Bay, NE of Farasan Village; growing on cliffs in steep ravine in fossil coral. 30 ft.



Cleome chrysantha ◆

A bushy leafy herb 20 cm tall covered in soft hairs; bright yellow flowers 1 cm wide; very aromatic. Fairly widespread in rocky ground around the 1000 ft. contour south of Makkah.

Wadi Kharar, near the foot of the Taif escarpment, 130 km from Jiddah; among rocks. 1,500 ft.



◆ *Cleome* sp. aff. *droserifolia*

A bushy leafy herb to 25 cm tall with almost orbicular palmately-veined leaves; yellow flowers 4 mm wide with small petals and yellow filaments; aromatic. Locally widespread.

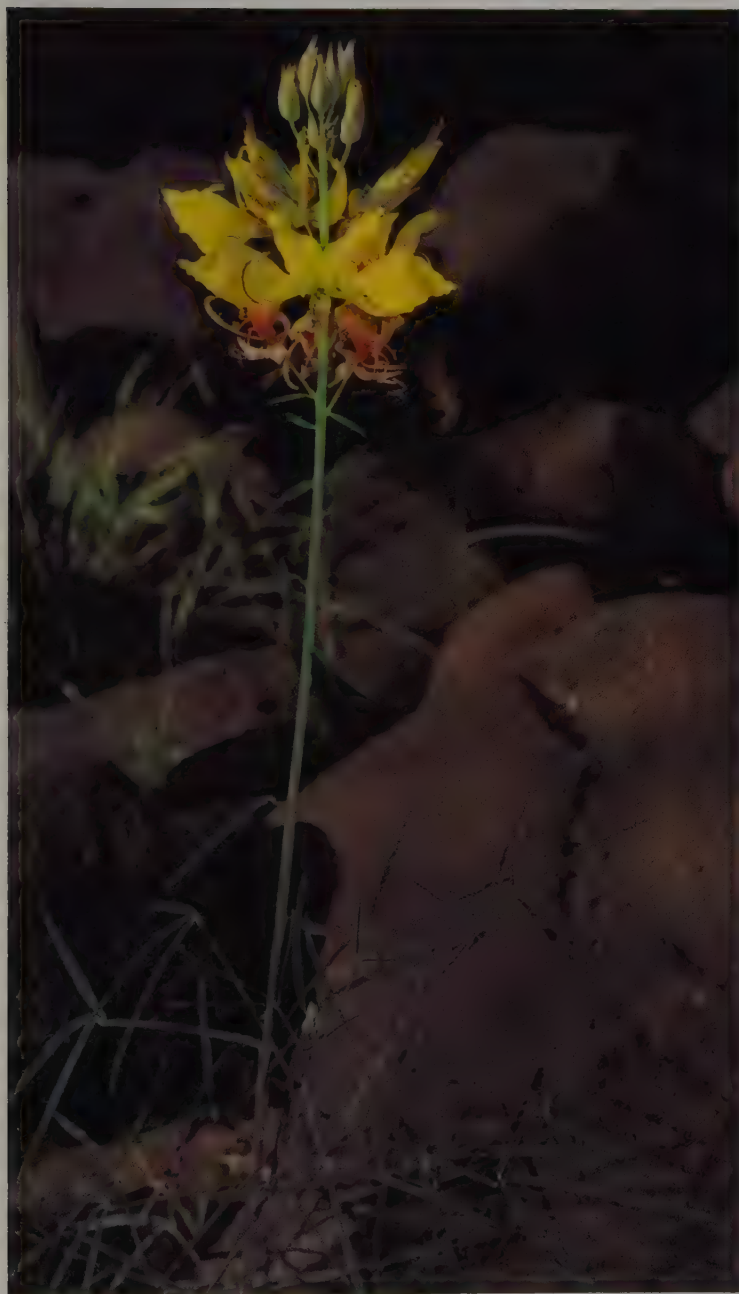
Harrat Khaybar Camp (25° 41'N, 39° 57'E) near airstrip; in black cinder gravel on side of volcano. 5,800 ft.



◆ *Cleome droserifolia* ◆

A shrub to 60 cm high with very hairy, oily, aromatic new growth; small yellow flowers 4 mm wide with long protruding lilac stamens.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; in a gravelly wadi. 2,000 ft.



◆ *Cleome paradoxa* ◆

A stiffly erect branching herb 1 m high with warty stems and long slender leaves; large yellow flowers 3 cm wide; no scent.

Near the junction of the Makkah Road with the Makkah By-Pass; on waste ground. 200 ft.



◆ *Cleome scaposa* ◆

A very slender erect herb 15 cm high with a few small round leaves; yellow flowers 3 mm wide; aromatic. An insignificant but widespread plant.

Wadi Kharar, near the foot of the Taif escarpment, 130 km from Jiddah; among rocks. 1,500 ft.



Cleome schweinfurthii ▲

An erect branching leafy herb 45 cm high with very aromatic foliage; the flowers 7 mm wide have white petals striped with sandy-yellow.

Al Hadda, at the top of the escarpment, Taif-Jiddah road; among granite boulders. 6,000 ft.



Cleome viscosa ▲

An erect leafy herb 45 cm high; pale yellow flowers 1 cm wide; aromatic.

Between Mudhaylif and Muhayl, on the Jiddah-Jizan road; at the edge of cultivated ground. 1,200 ft.



Dipterygium glaucum ▲

A slender-stemmed bushy herb 30 cm high; small yellow flowers 4 mm wide; no scent; flat, oval, winged fruits. A very common herb after rain, in some places carpeting the ground. Some authorities place this species in the Cruciferae, as it has features common to that family.

Near Jiddah; on sand flats. 80 ft.

◆ ***Cleome trinervia***

An erect bushy leafy herb 35 cm high with mainly simple, not trifoliolate, leaves; chestnut-brown flowers 1 cm wide. The whole plant is very aromatic.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; among rocks. 3,000 ft.



◆ ***Gynandropsis gynandra***

A branching herb with lobed palmate leaves and with stems to 30 cm long; white flowers flushed with pale lilac; long protuding style; sweet scent. Fairly widespread in the south especially near cultivated ground.

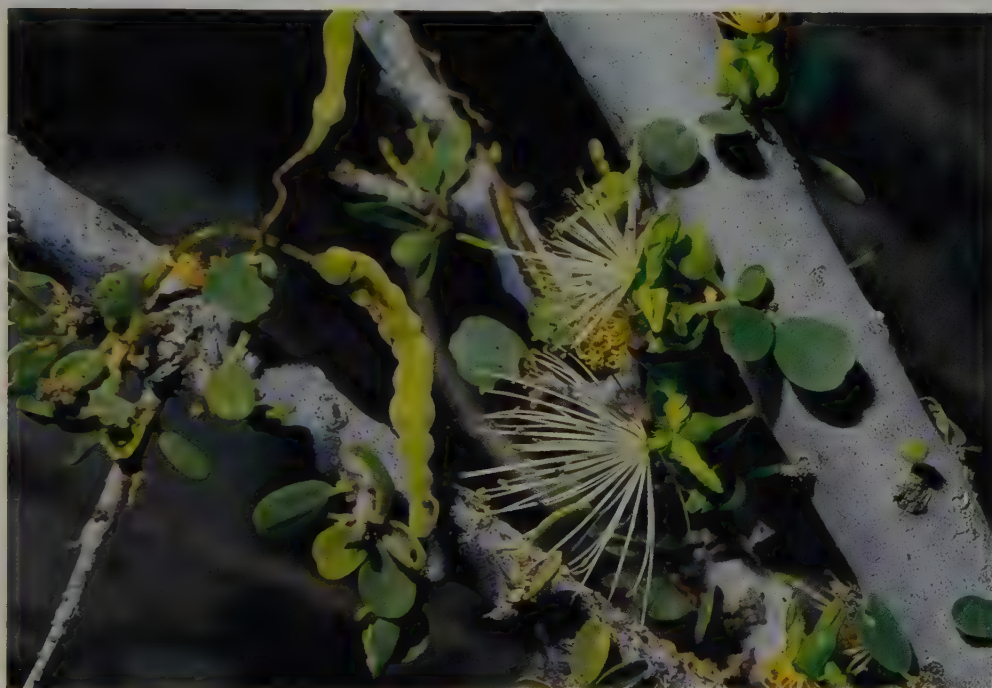
Between Jiddah and Taif, at Kilometre 100 on the Makkah By-Pass; in gravelly sand under bushes. 1,000 ft.



◆ ***Maerua triphylla***

A leafy shrub 1 m tall with trifoliolate leaves; flowers consisting of a rounded tuft of white stamens 2 cm wide, cupped in a green calyx 8 mm wide; spherical green fruits 1 cm wide; non-aromatic.

Jabal Fayfa, 100 km NE of Jizan; pendent from an earthy road cutting, eastern aspect. 5,000 ft.



◆ ***Maerua oblongifolia***

A tangled leafy vine; flowers with green sepals edged creamy white and clusters of long white stamens and style 1.8 cm wide; no scent. A widespread plant, sometimes found as a prostrate creeper on the ground.

Among rocky hills, 10 km east of Jiddah; scrambling through a low bush in hard sand among rocks. 80 ft.



◆ ***Maerua crassifolia***

A small-leaved shrub 2 m high; flowers with yellowish green sepals and clusters of long white stamens and style 1.8 cm wide; no scent. The bean-like fruits are constricted between the seeds. A widespread plant of variable appearance, sometimes found as a tree to 5 m high.

Low rocky hills, 10 km east of Jiddah; on a rocky hillside. 80 ft.

CAPRIFOLIACEAE

Only one species is found in Saudi Arabia, and this closely resembles the European honeysuckle. It is widespread in the Asir and south Hijaz especially in the juniper zone.



Lonicera etrusca ◆

A vine forming a dense tangled bush 3 m wide; tubular creamy flowers turning golden and flushed with pink, in large heads; very sweet scent.

On the way to Jabal Sawdah, NW of Abha; in a crack of a cliff. 8,000 ft.

CARYOPHYLLACEAE

In Saudi Arabia all the species of this fairly large family are herbs except the shrubby *Gymnocarpus*. They differ widely in appearance: the *Dianthus* and *Silene* species have relatively large showy flowers and it is hard to associate them with the strange looking *Pteranthus*, *Sclerocephalus*, or the tiny *Herniaria*. Only one species in the region, *Silene schimperiana*, is sweetly scented.

Arenaria leptoclados ◆

A leafy herb 7 cm high; tiny white flowers 3 mm wide; no scent.

Near the waterfall beauty-spot between Abha and Jabal Sawdah; growing in damp sand. 8,500 ft.





***Arenaria* (? *serpyllifolia*)** ◀

An erect delicate leafy herb 5 cm high; white flowers 5 mm wide; no scent.

Wadi Kharar, near the foot of the escarpment, Jiddah-Taif road; in shade among granite boulders. 1,500 ft.



Cerastium dichotomum* var. *inflatum ◀

A leafy herb 10 cm high; white flowers 8 mm wide; no scent.

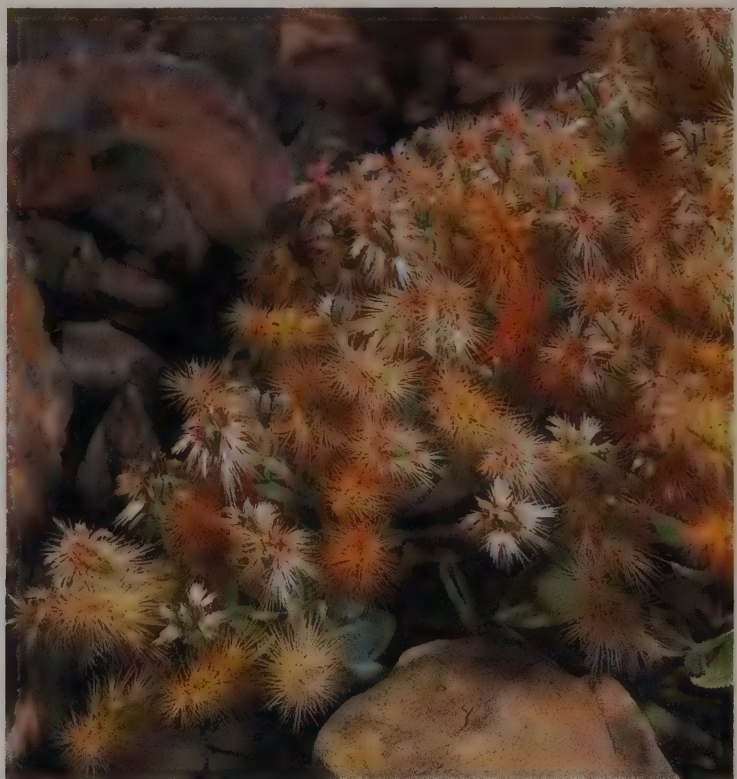
Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; on a rocky spur. 5,500 ft.



Cometes abyssinica ◀

A densely bushy slender-stemmed shrublet 25 cm high; tiny papery white flowers 1 mm wide carried among long branched creamy-white hair like bracts, in heads; no scent. Locally fairly widespread.

Low rocky hills, 10 km east of Jiddah; in hard sand among rocks. 80 ft.



Cometes surattensis ◀

A small bushy leafy-based herb 5 cm high; flowers tiny, among long simple white hair like bracts, in oval heads; no scent.

Between Khamis Mushayt and Najran, 45 km south of Zahran; in a crevice of a limestone outcrop. 6,200 ft.



Dianthus sinaicus ◆

A compact bushy shrublet 40 cm tall with tiny leaves; white flowers 1.5 cm wide, the fringed petals flushed with pink; no scent. Locally abundant.

Jabal Radwa, a 7,500 ft granite massif 70 km north of Yanbu; on a rocky col. 6,500 ft.



Dianthus uniflorus ◆

A delicate herb 8 cm high; deep pink flowers 1.5 cm wide; no scent. Fairly widespread in the southern mountains, often forming small cushions when grazed.

Near Suq al Ithnayn, 58 km south of Abha; on a sandstone plateau. 7,900 ft.



Dianthus zonatus ◆

A semi-prostrate herb with stems to 13 cm long; pale pink flowers 1.2 cm wide veined with red, the petals are slightly hairy; no scent. Fairly widespread in the Asir and southern Hijaz.

Between Taif and Abha, 50 km south of Baljurshi; on a rocky hill. 7,900 ft.

◆ ***Dianthus strictus***

A tufted herb with narrow leaves and flower stems to 30 cm long; pink flowers 2.3 cm wide with darker veins; no scent. Similar to *D. zonatus* but the petals are less hairy.

North of Shiqri, off the Tabuk road; in crevices of red sandstone buttes. 3,100 ft.



Gymnocarpos decandrum ♀

A white-stemmed woody shrub 60 cm high with short terete succulent leaves; greenish yellow flowers 6 mm wide; faint sweet scent. Fairly widespread in the north.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; on a rocky hillside. 2,200 ft.



Gypsophila* aff. *antari ♀

A slender-branching herb 15 cm high; white flowers 9 mm wide with reddish stripes on the outside of the petals; no scent.

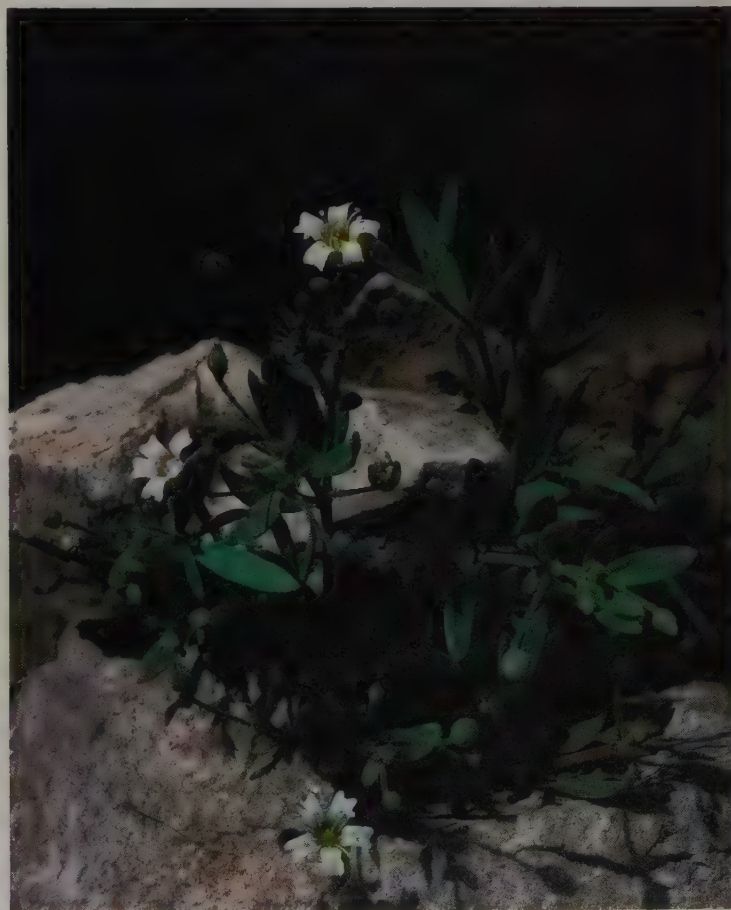
Wadi Halahila, 20 km north of the Police Check Point 40 km NNW of Najran, on the Abha road; among rocks. 4,500 ft.



Gypsophila antari ♀

A slender many-branched herb 45 cm high; white flowers 8 mm wide with lilac and green streaks; no scent. A fairly widespread herb in the north.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; in a valley on the southwestern side, in sand. 1,400 ft.



***Gypsophila* sp.** ♀

A grazed leafy 'cushion' herb 7 cm high; white flowers 8 mm wide with cleft petals; no scent.

Red granite mountain, 15 km SW of Al Hadda, off the Taif-Jiddah road; in a sunny rock crevice. 7,000 ft.



Herniaria hirsuta ♣

A small totally prostrate many-branched leafy herb; green buds 2 mm long; no scent.

Near the edge of the escarpment, off the Grandi Lavori Road, 5 km south of Baljurshi; in the damp sand of a shallow ravine. 7,000 ft.



Minuartia picta ♣

A tiny herb 3 cm high with terete leaves; white flower-buds 2 mm wide; no scent.

Near the summit of Jabal Shar, a granite massif 85 km SW of Tabuk; in a rock crevice. 5,000 ft.



Minuartia filifolia ♣

A cushion herb with thin leaves and slender flower stems to 10 cm long; white flowers 8 mm wide; no scent. Widespread in the juniper zone in the Asir and southern Hijaz.

A red granite mountain on the lip of the escarpment, 15 km SW of Al Hadda, off the Taif-Jiddah road; in a crevice on a cliff. 7,000 ft.



Holosteum umbellatum* var. *glutinosum ♣

A slender leafy herb 13 cm high; white flowers 9 mm wide flushed with pink; no scent.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; in a silt-pan on a rocky spur. 5,500 ft.



Paronychia arabica ◆

A semi-prostrate many-branched bushy leafy herb with stems to 23 cm long; pale greenish-white papery flowers 4 mm wide; no scent. It is a leafier plant of more lax habit than *Paronychia argentea*.

Near Zabirah, 200 km north of Buraydah; in a clay-pan. 1,800 ft.

Paronychia argentea ◆

A prostrate leafy herb 8 cm wide; white papery flowers 3 mm wide, tightly packed among papery bracts; no scent. A very widespread herb.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; in a sand-pan on a rocky spur. 5,500 ft.



Paronychia chlorothyrsa ◆

A prostrate mat-forming herb 8 cm wide; papery flowers 3 mm wide, thickly clustered in heads; no scent. Widespread in North Africa.

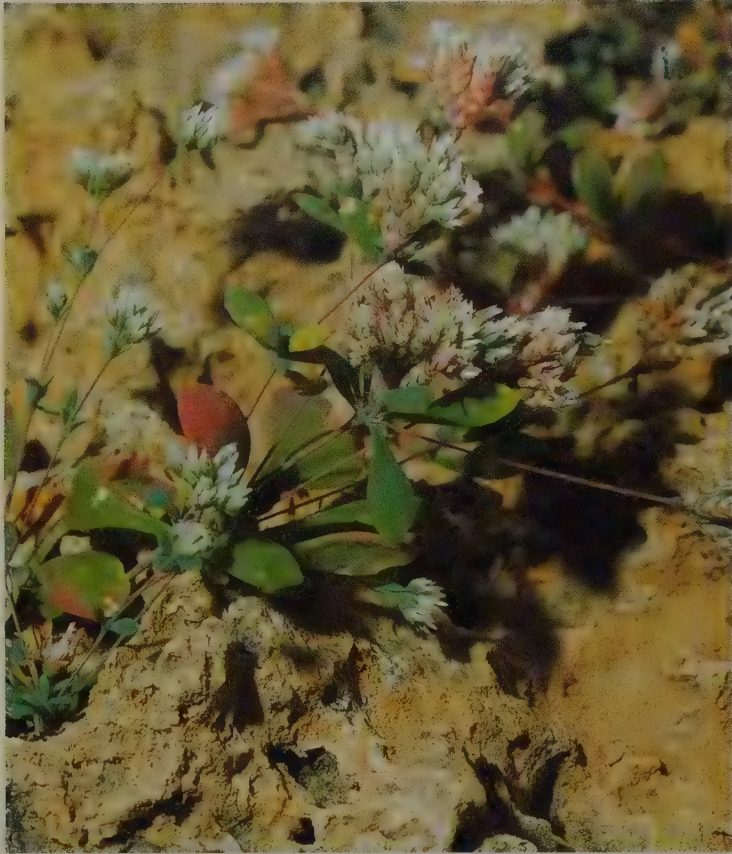
Jabal Manfah, 50 km NNW of Najran; in hard sand near a sandstone outcrop. 6,200 ft.



Polycarpaea repens ◆

A slender branching almost leafless prostrate herb with stems to 12 cm long and tiny leaves; papery green flowers 1 mm wide; no scent. Fairly widespread.

Low rocky hills, 10 km east of Jiddah; in drifted sand. 100 ft.



Polycarpaea spicata ◆

An erect slender branching herb to 10 cm high with a basal rosette of leaves; crowded heads of tiny greenish bud-like flowers. Locally common.

80 km north of Yanbu al Bahr, on the coast; in crevices of fossil coral cliffs, exposed and spray-drenched. 5 ft.



Pteranthus dichotomus ◆

A semi-prostrate leafy herb branching from the base with stems 25 cm long; tiny greenish flowers 1 mm wide which, together with small flat pink-winged and branched structures, are all carried on top of the flattened oval peduncle; no scent.

Near Riyadh al Khabra, SW of Buraydah; in a fallow field. 2,000 ft.



Polycarpon tetraphyllum ◆

A semi-prostrate leafy branching herb with stems to 7 cm long; papery greenish flowers 3 mm wide.

Near the edge of the escarpment off the Grandi Lavori Road, 5 km south of Baljurshi; in the damp sand of a shallow ravine. 7,000 ft.



Robbairia delileana ◆

A delicate-stemmed many-branched prostrate herb with stems to 25 cm long; white flowers 3 mm wide flushed with pink; no scent. A fairly widespread plant.

Near Nabhaniyah, 100 km SW of Buraydah; in the hard sand of a fallow field. 2,300 ft.



Saponaria umbricola ♣

A bushy herb with brittle stems 12 cm long and thick succulent leaves; white 5 mm wide with recurved notched petal tips; no scent.

The new Abha to Muhayl road, 5 km from the summit; pendent from crags and in rubble in a shady ravine. 7,000 ft.



Sclerocephalus arabicus ♣

A bushy leafy herb 13 cm high with narrow succulent leaves; tiny greenish flowers 1 mm wide, embedded in oval spiny heads 1 cm across; no scent. A widespread plant especially in the north.

Near Nabhaniyah, 100 km SW of Buraydah; in hard sand in protected desert near the village. 2,300 ft.



Scleranthus annuus ♣

A prostrate herb with radiating stems to 10 cm long and small terete leaves; greenish papery flowers 2 mm wide.

Near Jabal Ibrahim, off the Taif-Abha road; in sand by a dry stream in a grassy wadi. 7,000 ft.



Silene apetala ♣

An erect slender single-stemmed leafy herb to 25 cm high; pale pink flowers 8 mm wide with inflated calyx; no scent. Night flowering. Fairly widespread in the Asir.

One-third of the way up the escarpment, Jiddah-Taif road; in damp sand among granite boulders. 3,500 ft.



Silene coniflora ◆

A leafy herb 8 cm high; brilliant deep pink four-petalled (freak) flower; no scent.

Jabal Dabbagh, a 7,500 ft. granite massif 88 km SW of Tabuk; in a small sand-pan, near water. 5,500 ft.

◆ ***Silene* sp. aff. *burchellii*** ◆

A slender branching woody-based herb 25 cm high with fairly wide hairy leaves; white flowers flushed with lilac 1.5 cm wide; no scent. The flowers open at dusk. Widespread in the Asir and southern Hijaz.

Waterfall beauty-spot between Abha and Jabal Sawdah; in a shady rock crevice. 8,500 ft.



◆ ***Silene conoidea*** ◆

An erect leafy herb 20 cm high; deep pink flowers 1.5 cm wide with papery calyx becoming inflated in fruit; no scent. Fairly widespread in the Asir and southern Hijaz.

Tannumah, a watered valley 12 km south of An Nimas; a weed in a cornfield. 6,500 ft.

◆ ***Silene arabica***

A slender branching herb 30 cm high; white flowers 1.8 cm wide with pale reddish stripes on the back of the very divided petals; no scent.

Nabhaniyah, 100 km SW of Buraydah; in the shade of a tamarisk hedge bordering enclosed desert. 2,300 ft.



***Silene gallica* var. *quinquevulnera* ◆**

An erect leafy herb with stems to 20 cm high; white flowers 5 mm wide flushed with deep pink; no scent; very hairy calyx. Fairly widespread in the southern mountains especially as a weed in cornfields.

Near the lip of the escarpment off the Grandi Lavori Road, 5 km south of Baljurshi; in damp sand in a shallow ravine. 7,000 ft.



***Silene macrosolen* ◆**

A slender branching herb with glaucous blue-green leaves and very sticky stem 50 cm high; white flowers 2.5 cm wide; no scent. Evening flowering.

Jabal Sawdah, 28 km NW of Abha; on the lip of the escarpment near a watered ravine, in light shade. 9,000 ft.



***Silene linearis* ◆**

A very slender-stemmed branching herb 20 cm high with almost terete leaves; white flowers 7 mm wide with partly divided petals; no scent.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; in a gravelly wadi. 2,000 ft.



***Silene schimperiana* ◆**

A slender branching herb with glaucous blue-green leaves and very sticky stem 50 cm high; white flowers 2.5 cm wide; sweet scent. Early morning flowering.

North of Al Bahah, on the Taif-Abha road; on a stony grass-covered hillside. 6,500 ft.



Silene villosa ◆

A very sticky leafy herb 15 cm high; white flowers 2 cm wide; no scent. Widespread in the north.

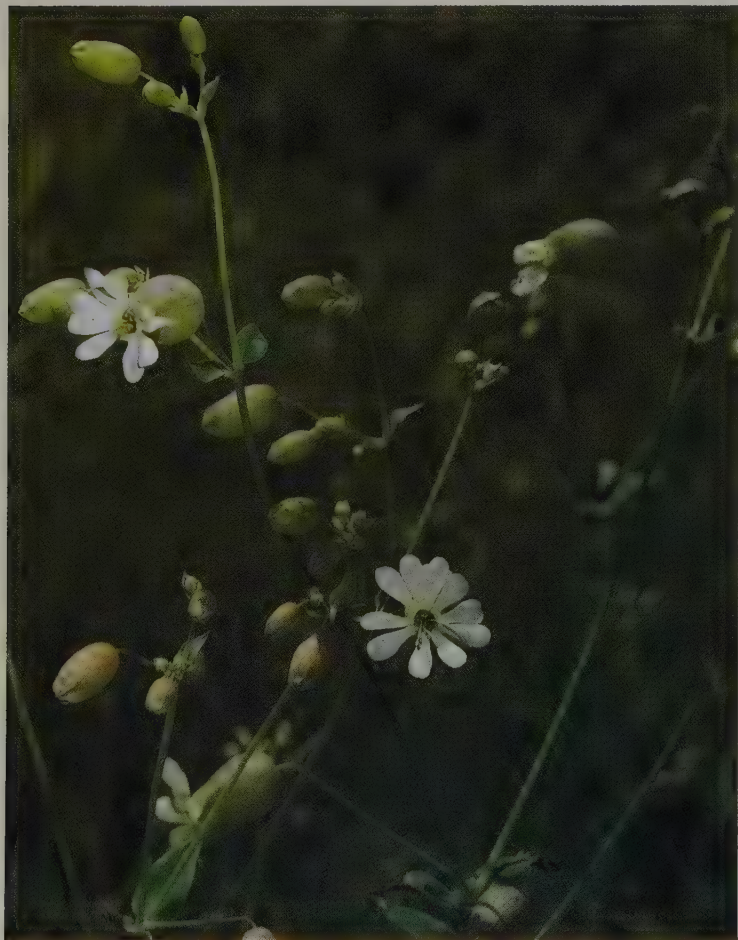
A pink granite valley in the Jabal Ash Shati range, 30 km NE of Ash Sharmah; in damp gravelly sand. 4,000 ft.



***Silene yemensis* p.p.** ◆

An erect sparsely branching herb 25 cm tall with a basal rosette of spatulate leaves; pale pink flowers 1.5 cm wide with deeply cleft petals; no scent. Fairly widespread in the southern mountains.,

Head of the descent to Wadi al Uss near Jabal Sawdah, NW of Abha; among rocks bordering fields. 8,500 ft.



Silene vulgaris ◆

A slender branching herb 50 cm high; white flowers 2 cm wide with bulbous pale green calyx; no scent.

120 km south of Baljurshi, on the Taif-Abha road; under acacias in an abandoned terraced field. 6,100 ft.



***Silene* sp. 1912** ◆

A slender erect herb 20 cm high with narrow leaves; small white flowers 5 mm wide with partly cleft petals.

One-third of the way up the escarpment, Jiddah-Taif road; in a silt-pan among rocks. 3,500 ft.



***Silene* sp. 4540** ◆

A bushy twiggy herb 1 m high with very sticky stems and narrow glaucous leaves; creamy white flowers 1.5 cm wide with purplish-black anthers; no scent. Night flowering. Similar to *S. macrosolen* except that the calyx and corolla tube are much shorter and the anthers are black.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; on a northwestern spur. 5,500 ft.

Spergula fallax ◆

An erect tufted delicate-stemmed herb 13 cm high with terete leaves; white flowers 7 mm wide. Widespread in the north. This species is sometimes confused with *Spergularia diandra*, but the white flowers are always larger.

25 km north of Qiba, and 180 km north of Buraydah; in hard sand near the limestone escarpment. 1,500 ft.



Spergularia bocconii ◆

An erect tufted herb with delicate stems 10 cm tall; deep pink flowers 5 mm wide.

Wadi Sabha near Zabirah, 200 km north of Buraydah; in hard sand over limestone. 1,800 ft.



Spergularia diandra ◆

A very delicate branching herb 6 cm high; pink flowers 4 mm wide; no scent. Fairly widespread in the north.

Near Shiqri, SW of Tabuk; in damp sand near a water-hole. 3,100 ft.

Spergularia rubra ◆

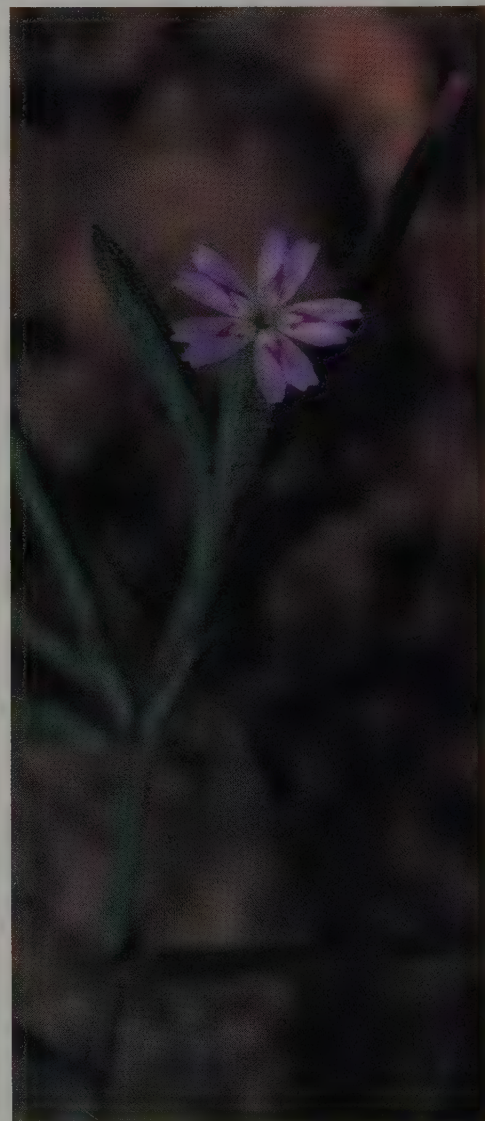
A branching glandular-hairy herb 10 cm tall with terete leaves; pale pink flowers 6 mm wide. Similar to *S. diandra* but the fruits are different.

Dirab Farm, 30 km west of Riyadh; weed in a cornfield. 1,800 ft.

***Telephium sphaerospermum*** ◆

A tiny semi-prostrate herb with stems to 3 cm long and blue-green leaves; white flowers 4 mm wide; no scent; evening flowering.

Between Khamis Mushayt and Najran, 45 km south of Zahran; near a limestone outcrop. 6,200 ft.

◆ ***Velezia rigida* sensu lato** ▲

A semi-prostrate many-branched almost leafless herb with stems to 25 cm long; tiny pink flowers 3 mm wide with crimson markings. A common weed in the Caucasus.

A red granite mountain 50 km south of Baljurshi, on the Taif-Abha road; in gravel. 6,500 ft.

CELASTRACEAE

Of the five species in Saudi Arabia, two are thorny shrubs. *Maytenus somalensis* is widespread in the south, mainly in the juniper zone of the Asir and southern Hijaz, and *M. senegalensis* is found in the north. In some countries a medicinal extract is made from this shrub, though the author has not observed this in Saudi Arabia.

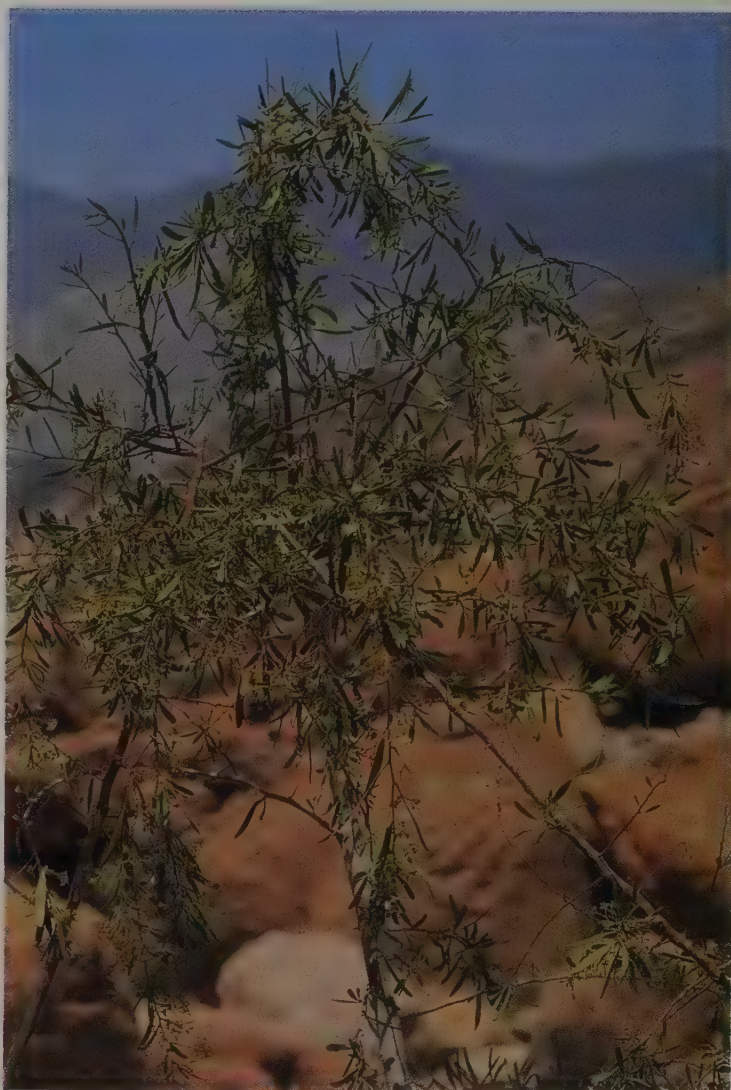
At one time *Catha edulis*, the 'Qat' tree, was widely cultivated for its narcotic leaves which were chewed or used in making Arabian tea. This practice is now condemned though the shrub is still grown in neighbouring Yemen.



◆ ***Maytenus heterophylla***

A non-spiny black trunked tree with rugged ridged bark and slightly spatulate leaves; in fruit; the red flushed pale yellowish fruits 6 mm long and splitting into two segments; reddish seed with white fleshy aril; non aromatic but tastes like *Catha edulis*.

Wadi Sud'r, 44 km SSE of Abha; among shrubs on a rocky hillside. 4,500 ft.



◆ ***Maytenus senegalensis*** ◆

A straggly thorny shrub 1.5 m high, the leaves with a serrate margin; creamy flowers 5 mm wide, borne in heads; the green fruits flushed with red.

Jabal Dabbagh, a 7,500 ft granite mountain 88 km SW of Tabuk; among rocks in a valley on the southwestern slopes. 1,440 ft.





Maytenus somalensis ◆

A leafy spiny shrub nearly 3 m high; creamy flowers 5 mm wide; no scent; the pink seed capsules split into three when ripe. Fairly widespread and somewhat variable.

Between Taif and Abha, 45 km south of Baljurshi; on a rocky, red granite hill, with fairly dense vegetation. 6,500 ft.



Maytenus undata ◆

A round-crowned bushy shrub 1.5 m tall with alternate dentate leaves; creamy-green flowers 4 mm wide; no scent; the spherical fruits are three-part capsules 5 mm in diameter; non-aromatic.

Near Jabal Ibrahim, off the Taif-Al Bahah road; among large pink granite boulders. 7,000 ft.



***Maytenus* sp.** ◆

A slender-stemmed shrub 2 m tall with arching branches; white flowers 2 mm wide, in almost round heads; sweet scent.

17 km west of Abha on the Jizan road; at base of cliff on steep ravine side. 4,500 ft.

CHENOPODIACEAE

This fairly large family mostly colonises salt pans, both coastal and montane, though one species, *Chenopodium schraderianum*, grows in apparently sweet soil in rock crevices in the mountains; other species are weeds of cultivation, though here there may be a degree of salinity in the soil. The plants are herbs or small shrubs, annual or perennial, and vary greatly in

appearance; some have leafless, cactus-like jointed stems, others have large soft leaves. Economically many species are an important browse, especially for camels, being the only succulent green plants to survive in some areas during the dry season; however, owing to toxic salts in their tissues, certain species cause acute diarrhoea and are seldom grazed.



***Aellenia subaphylla* ◆**

A sparsely-branched stout green-stemmed shrublet 25 cm tall with thick scale-like leaves; the flowers consist of yellow stamens arising from the apex of small cone-shaped bodies 4 mm wide.

Baid al Jimalah, 200 km SW of Buraydah; in hard sand of wide wadi. 2,700 ft.



***Anabasis cf. ehrenbergii* ◆**

A semi-prostrate many-branched woody-stemmed herb with stems to 1 m long and with short fleshy cylindrical leaves; the flowers consist of purple anthers arising from pairs of fleshy bodies 2 mm wide.

Coastal inlet near Dhahaban, 55 km north of Jiddah; growing in sand at high-tide level. Sea level.

***Anabasis setifera* ◆**

A sprawling woody-based herb 30 cm high with succulent green stems and tiny fleshy leaves; flowers reduced appearing as clusters of yellow stamens at the nodes. The nodes swell and split releasing the ripe fruits buried in white 'wool'.

Between New Jiddah Airport and Madinah road, Jiddah; in a shallow sandy ditch. 20 ft.





***Atriplex dimorphostegia* ◆◆**

A juicy green many-branched leafy herb 50 cm high; young leaves glisten as if dew covered; tiny bud-like yellowish flowers in clusters 2 mm wide; no scent. The habit of the plant is variable.

Between Riyadh al Khabra and Qassim, near Buraydah; in a fallow field, 2,300 ft.



***Arthrocnemum glaucum* ◆**

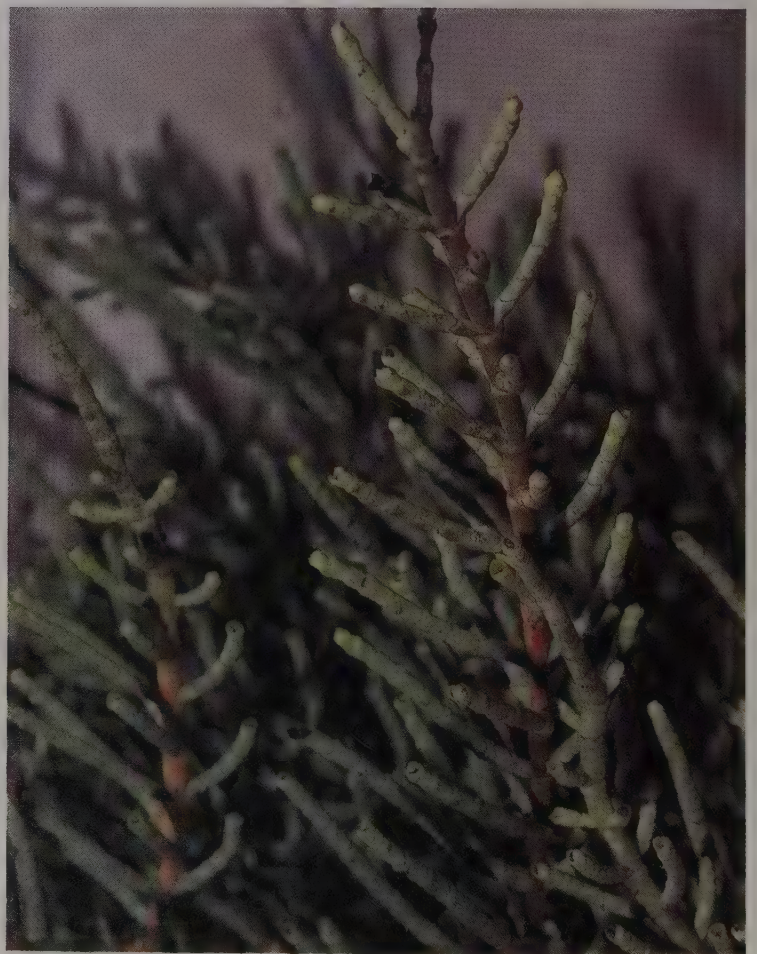
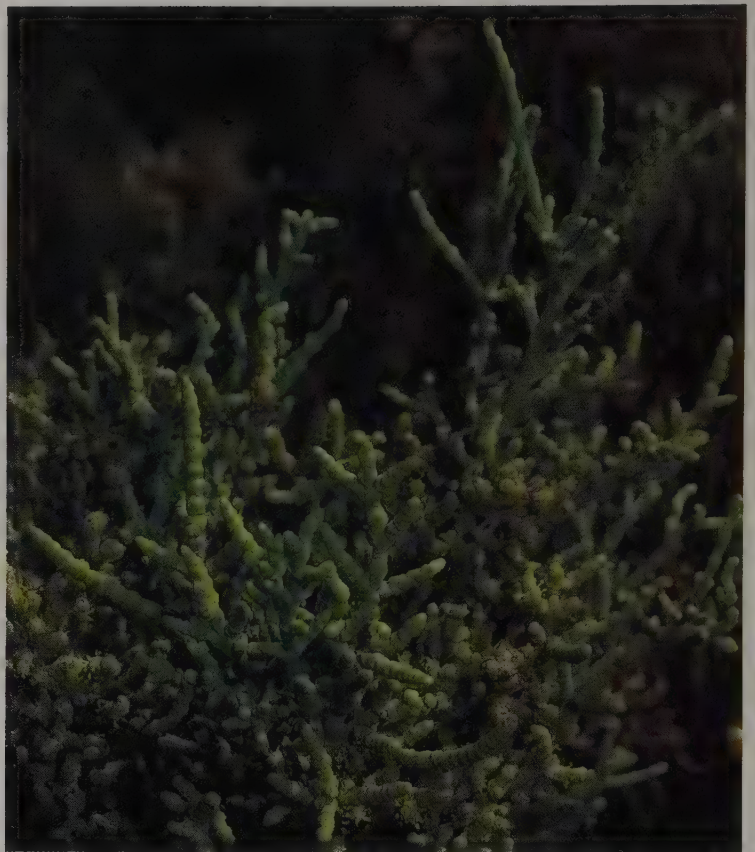
A wide spreading woody-based shrub 1 m tall, the frond-like stems composed of jointed green segments; sterile.

Umm Sidrah Coast Guard station, 75 km north of Jiddah; at the water's edge. Sea level.

***Arthrocnemum macrostachyum* ◆**

A sprawling succulent shrub 35 cm high and 1 m wide with cylindrical jointed dark green stems; flowers not seen.

Farasan Island, NE region; in saline sand near the seashore. 3 ft.





Atriplex farinosa ◆

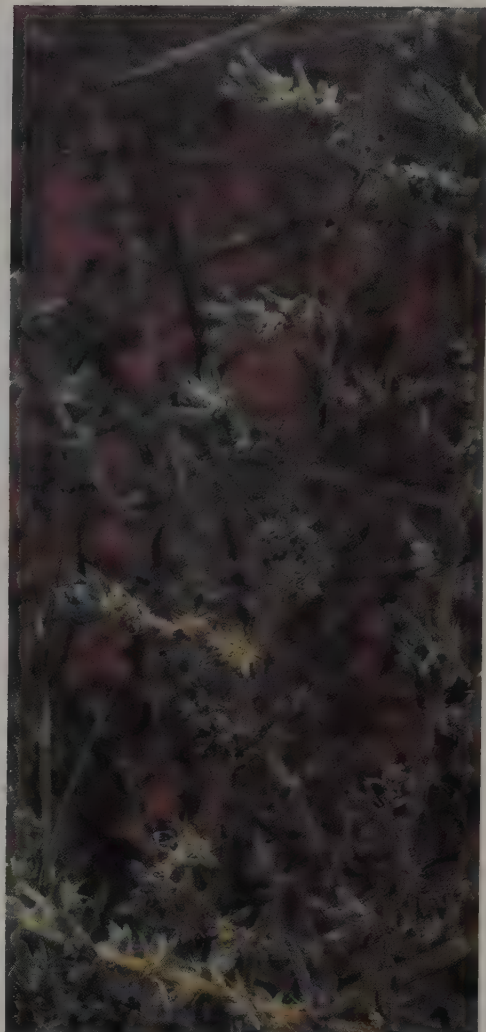
A wide bushy shrub 1 m high densely covered with blue-green lanceolate succulent leaves; clusters of tiny yellowish buds; fruits enclosed in pairs of flat circular bracts.

Near Jiddah; on the seashore. 10 ft.

Bassia muricata ◆

A bushy grey-green woody-based herb 45 cm high with small downy leaves; the tiny yellow flowers are 1 mm wide and the calyces develop into spiny stars.

Near Zabirah, 200 km north of Buraydah; in shallow drifted sand over a bauxite outcrop. 3,100 ft.



Atriplex leucoclada ◆

A twiggly herb 30 cm high with white stems and small greyish leaves; bud-like flowers in apical spikes.

Between Riyadh al Khabra and Qassim, near Buraydah; in a fallow field. 2,300 ft.

Bassia eriophora ◆

A branching pink-stemmed herb 30 cm high with pink and green leaves; flowers not seen; the fruits are hidden in conspicuous clumps of dense white fleece. Widespread in the north.

Uqlat as Suqur, between Madinah and Qassim; on salt flats near the village. 2,850 ft.





Beta vulgaris ◆

A grazed herb with stems 20 cm long; greenish succulent flowers 5 mm wide, each subtended by a leaf-like bract, in terminal spikes.

The waterfall beauty-spot between Abha and Jabal Sawdah; in damp sand by the stream. 8,500 ft.



***Beta* sp.** ◆

A leafy semi-prostrate herb 30 cm high; hard green bud-like flowers 4 mm wide; non-aromatic.

Wadi Sabha, near Zabirah, 200 km north of Buraydah; on a shallow limestone outcrop. 1,800 ft.

Chenopodium album ◆

A slender branching leafy herb 40 cm tall the whole plant covered with greyish meal; tiny bud-like flowers with yellow stamens, in spikes. A widespread and variable plant.

Al Hadda, on the Jiddah-Taif road; on waste land. 7,000 ft.



Bienertia cycloptera ◆

A branching shrublet 45 cm high with thick succulent leaves; flowers consisting of stamens arising from green 'buds' 2 mm wide.

Uqlat as Suqur, on the Madinah-Qassim road; on salt flats near the village. 2,850 ft.





Chenopodium ambrosioides ◆

A leafy branching herb 75 cm tall, the unevenly lobed leaves with dentate margins; bud-like flowers 1 mm wide, crowded in axillary spikes; aromatic.

Mahalla Reservoir, near Abha; in damp sand among *Tamarix* bushes. 6,000 ft.

Chenopodium murale ◆

A leafy herb 30 cm tall, the whole plant slightly white-mealy; wide leaves with toothed margin; clustered green buds 2 mm wide, in spikes.

Wadi Khulays, 75 km NNE of Jiddah; a weed of cultivation. 200 ft.



Chenopodium opulifolium ◆

An erect branching leafy herb 35 cm tall with slightly mealy stems and leaves; tiny greenish bud-like flowers, in clusters.

Near Al Hadda, off the Jiddah-Taif road; by the roadside near cultivated ground. 6,800 ft.

Chenopodium schraderianum ◆

An erect leafy herb 25 cm high with lobed leaves; clusters of tiny green buds; very aromatic. Locally abundant.

Lip of the escarpment, near the King's Palace, Abha,; among rocks. 7,000 ft.





Cornulaca monacantha ♣

A very spiny-leaved woody shrublet 50 cm high; occasional dense clusters of spiny bracts, white-hairy at the base; wintering.

West of Buraydah, between Riyadh al Khabra and Qassim; on waste land. 2,000 ft.



***Cornulaca* sp.** ♣

An erect sparsely-branched shrublet 14 cm tall with long pale brown spines; flowers consisting of yellow stamens buried in white woolly hairs among tiny green 'buds', in the spine axils.

Turayf Camp (31° 40' N, 39° 29' E); in hard sand of shallow runnel of limestone plateau. 2,900 ft.



Halocnemum strobilaceum ♣

A bushy leafless shrub 60 cm high, the stems consisting of fleshy green and grey segments. The fruits resemble cones.

Jabal Tamiyah, an isolated sandstone-capped mount near Uqlat as Suqur, between Madinah and Qassim; in crevices of the summit plateau. 4,450 ft.



***Halogeton* sp.** ♣

A bushy white-stemmed shrublet 20 cm tall with small succulent leaves each ending in a spine; flowers not seen. The fruits buried in white woolly hairs in the leaf axils.

Turayf Camp Three (30° 51' N, 38° 56' E); in hard sand of shallow runnel of plateau. 2,600 ft.



***Halopeplis perfoliata* ◆**

A woody-based herb with stems made up of oval green succulent segments, the young flowering twigs red; flowers reduced to yellow stamens. Widespread along the coast.

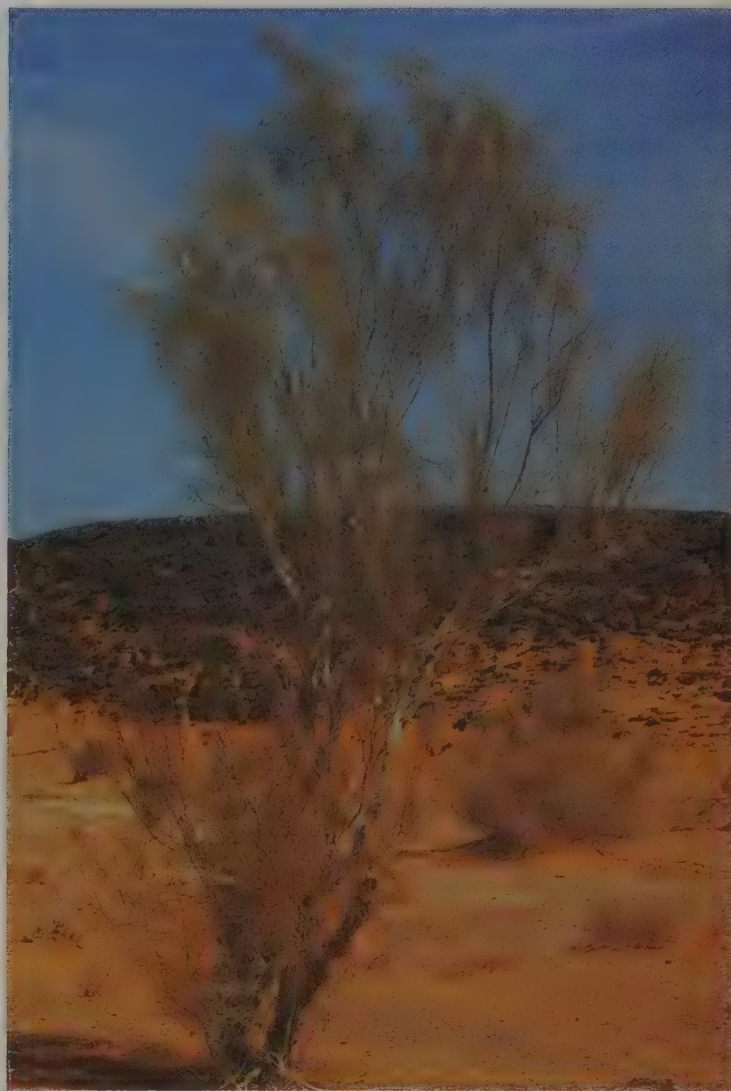
Near Jiddah; on the seashore. 10 ft.



***Hammada salicornica* ◆**

A spindly thin-stemmed grey bush 1 m high composed of succulent segments; flowers consist of yellow stamens protruding from the joints. Often infected with large purplish galls. Widespread in saline soils.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; in gravelly wadi. 2,000 ft.



***Haloxylon ammodendron* ◆◆**

A shrubby tree 3 m tall with silver-grey trunk, very slender erect branches and tiny segmented leaves; flowers reduced to groups of yellow anthers; no scent. Locally fairly widespread especially on sand dunes.

100 km NW of Thaniyat Camp (29° 46'N, 37° 58'E); in wide sandy wadi. 2,600 ft.





Hammada scoparia ◆

A slender-branched woody-based herb 50 cm tall with pale green stems; fawn papery flower-like fruits 8 mm wide. A widespread saltbush.

Wadi Fatimah, between Jumum and Makkah; near a fallow field. 500 ft.



Kochia indica ◆

An erect spire-shaped white-hairy leafy herb 45 cm tall; a young plant; the tiny yellow flowers not seen.

Dirab Farm, 30 km west of Riyadh; a weed in a fallow field. 1,800 ft.



Noaea mucronata ◆

A spiny bushy grey-green shrub with slender brittle stems to 1 m long; flowers consisting of deep pink stamens arising from a calyx 5 mm long; no scent. Locally widespread.

Near Harrat Khaybar Camp (25° 41' N, 39° 57' E); in a rocky ravine near a lava flow. 5,700 ft.



Salsola* sp. aff. *alopecuroides ◆

A white-downy-stemmed twiggy shrublet 50 cm tall, having persistent, hard, dead leaves; flowers consisting of yellow anthers arising from small fleshy bodies.

Turayf Camp (31° 40' N, 39° 29' E); in shallow sandy run-off on limestone plateau. 2,900 ft.



Salsola baryosma ◆

A bushy shrublet 50 cm high with grey-green succulent leaves and spire-shaped branches; flowers not seen.

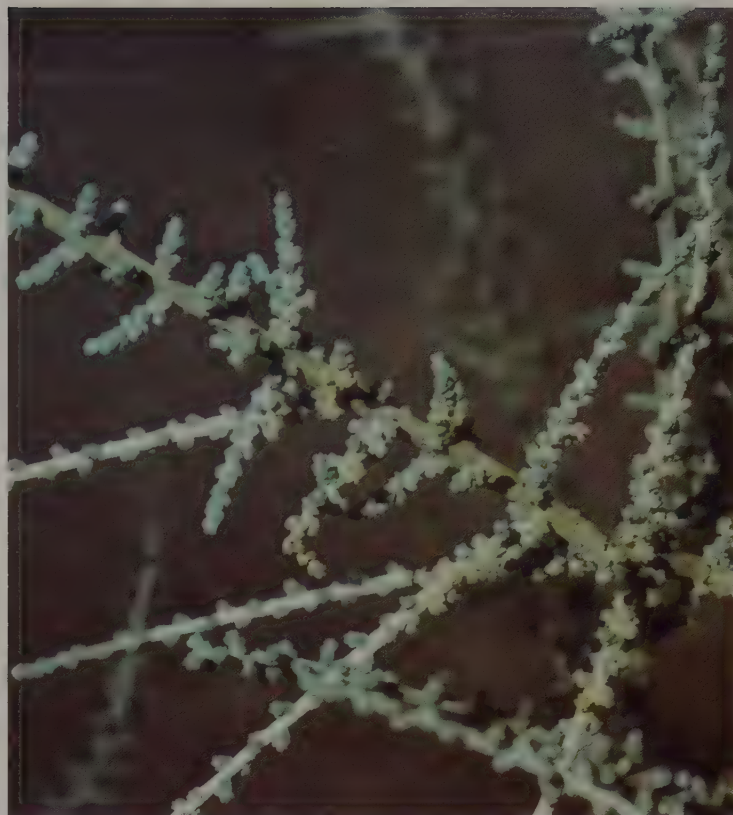
100 km north of Thaniyat Camp, south of Turayf; in clay-pan at base of volcanic blow hole. 2,500 ft.



Salsola bottae ◆

A twiggish green-stemmed shrublet 54 cm high, slightly mealy and with tiny leaves; yellow flowers 3 mm wide; non-aromatic.

40 km SW of Uqlat as Suqur, off the Madinah-Qassim road; on a rocky outcrop. 2,850 ft.



Salsola imbricata ◆

A woody shrublet with stems 1 m long and tiny succulent blue-grey leaves; flowers reduced to yellow stamens from leaf-like bodies.

Low rocky hills, 10 km east of Jiddah; in hard sand. 80 ft.



Salsola inermis ◆

A bushy shrublet 35 cm tall with a few small glaucous cylindrical succulent leaves to 5 mm long; dense clusters of flowers at intervals along the pale stems, composed of spherical bright green succulent bodies 2 mm wide with yellow stamens arising from the apex of each small group; sour 'cat' smell.

Qassim Airport; in hard sand near the parking apron. 2,000 ft.



Salsola kali ♣

A many-branched prickly succulent-leaved herb 24 cm high; tiny greenish flowers 1 mm wide, non-aromatic.

Al Hadda, off the Jiddah-Taif road; on waste land. 6,500 ft.



Salsola* cf. *schweinfurthii ♣

A spreading woody-stemmed herb 50 cm tall with tiny cylindrical leaves the young stems succulent, reddish; papery flower-like seed cases 7 mm wide.

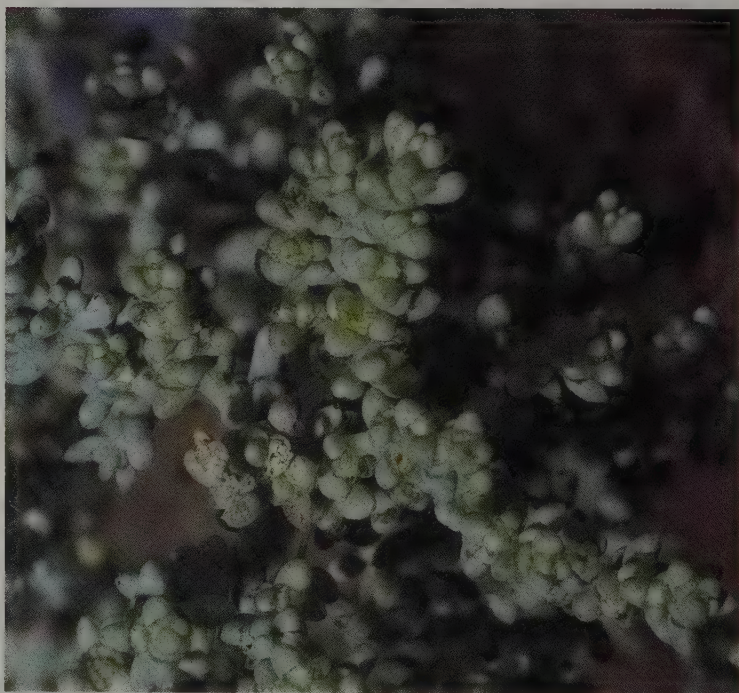
Between New Jiddah Airport and Madinah road, Jiddah; in a shallow sandy ditch. 20 ft.



Salsola spinescens ♣

A wide spreading woody-stemmed herb 50 cm tall with small round succulent leaves and pinkish young stems; flowers visible only as clusters of yellow stamens 1 mm wide; white, papery-winged seeds 4 mm wide resembling flowers.

Between new Jiddah Airport and Madinah road, Jiddah; in a shallow sandy ditch. 20 ft.



Salsola tetrandra ♣

A slender-stemmed twiggy shrublet 30 cm tall with tiny round succulent leaves 1 mm long; flowers reduced to yellow stamens arising from a pair of fleshy bodies.

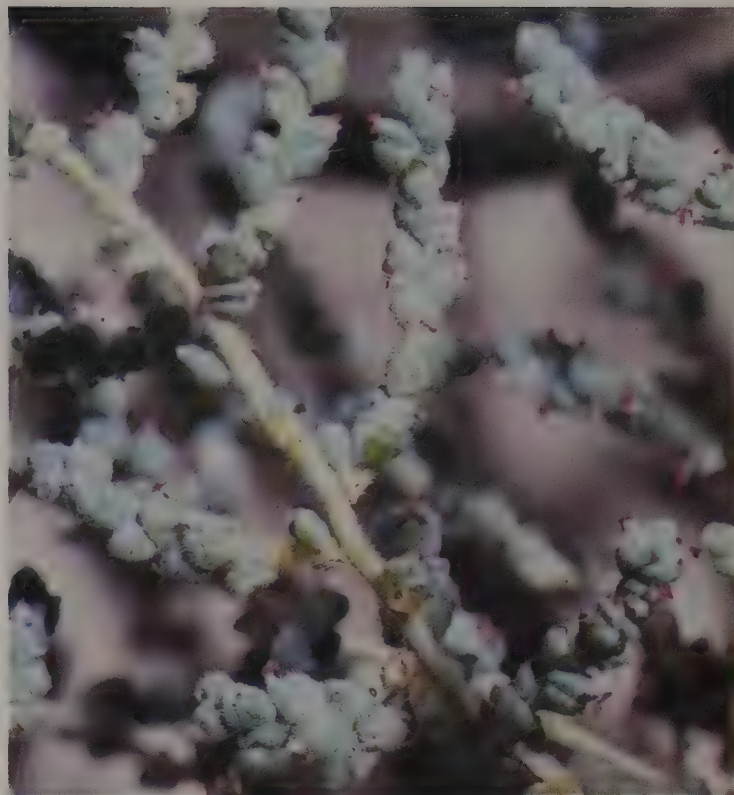
Baid al Jimalah, 200 km SW of Buraydah; in hard sand of a wide wadi. 2,700 ft.



***Salsola* (? *vermiculata*)** ◆◆

An erect slender-stemmed woody herb 25 cm tall with tiny succulent leaves and spiny 'bracts'; small buds in white woolly hairs at intervals along the stem.

60 km SE of Thaniyat Camp (29° 46'N, 37° 58'E); in ravine in low limestone scarp. 2,500 ft.



Salsola volkensii ◆

A bushy shrublet 25 cm tall with white-hairy slender greyish stems and small groups of almost spherical pale green succulent segments 2 mm wide; flowers reduced to crimson anthers arising from the apex of each group of segments; strong sour 'cat' smell.

Qassim Airport; in hard sand near the parking apron. 2,000 ft.



***Salsola* sp. 2442** ◆

A bushy succulent-leaved woody-based herb 25 cm high; the yellow anthers arise from spherical succulent bodies 5 mm wide; flower-like groups of papery winged fruits 6 mm wide.

Jabal Tamiyah, a sandstone massif SW of Uqlat as Suqur, off the Madinah-Qassim road; among rock slabs on the summit plateau. 4,450 ft.



***Salsola* sp. 2768** ▲

A bright green bushy shrublet 50 cm tall with very tiny succulent segments in spikes; flowers reduced to yellow anthers.

Aqiq Airport, inside the perimeter fence; in hard sand. 4,800 ft.



***Salsola* sp. 3840** ▲

A bushy bright green succulent-leaved herb 25 cm tall; tiny bud-like flowers with yellow stamens, crowded in terminal spikes.

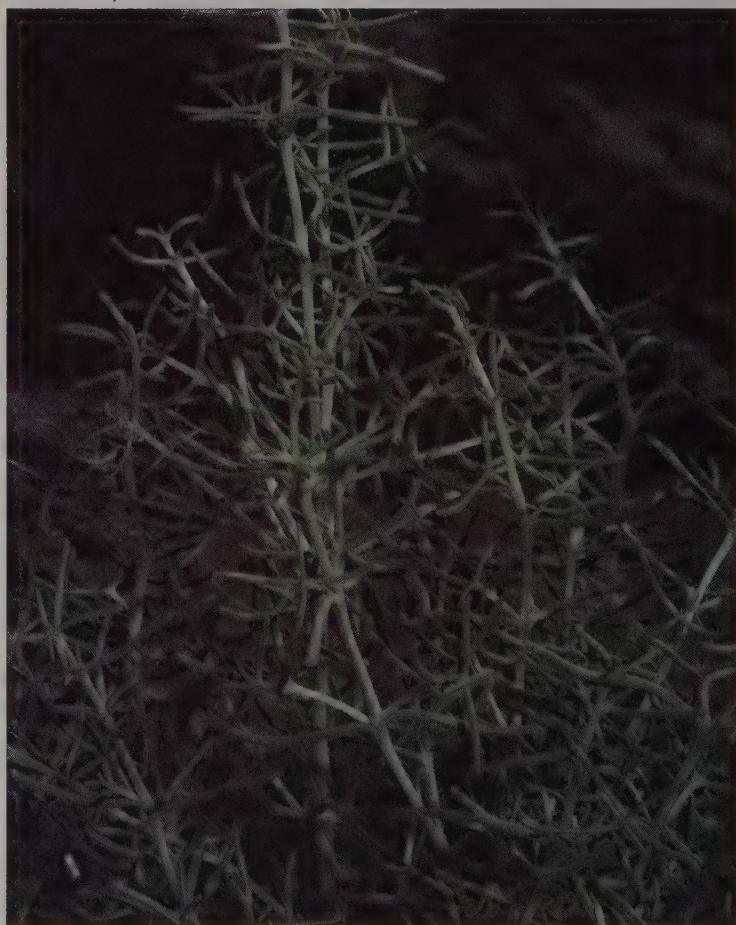
Near Harrat Khaybar Camp (25° 41' N, 39° 57' E); in drifted sand at edge of lava flow. 5,700 ft.



***Salsola* sp. 2840** ▲

A stiff-stemmed twiggy shrublet 30 cm tall with tiny spherical leaves clustered in clumps; flowers consisting of yellow stamens arising from the apex of small cone-shaped bodies.

Zabirah, 200 km north of Buraydah; among shrubby herbs in a wide sandy wadi. 1,800 ft.



Seidlitzia rosmarinus ▲

A woody-based shrublet 60 cm tall with white stems and narrow succulent green leaves. Sterile, flowers not seen.

Uqlat as Suqur, on the Madinah-Qassim road; on salt-flats near the village. 2,850 ft.



Suaeda aegyptiaca ▲

A bushy bright green succulent-leaved shrublet 40 cm tall and 1 m wide with narrow strap-shaped fleshy leaves; greenish-yellow flowers 5 mm wide with curved fleshy corolla; sour smell.

Farasan Island; in sand, just above high tide mark on the SW shore. 2 ft.



Suaeda fruticosa ▲

A woody-based bushy succulent-leaved herb 2 m high; pale green flowers 3 mm wide, in spherical groups near the apex of the young stems. Widespread in the southern lowlands.

Jiddah; waste ground near the sea. 10 ft.



Suaeda hortensis ▲

A bushy woody-based herb with small cylindrical succulent leaves; tiny reddish succulent flowers 2 mm wide.

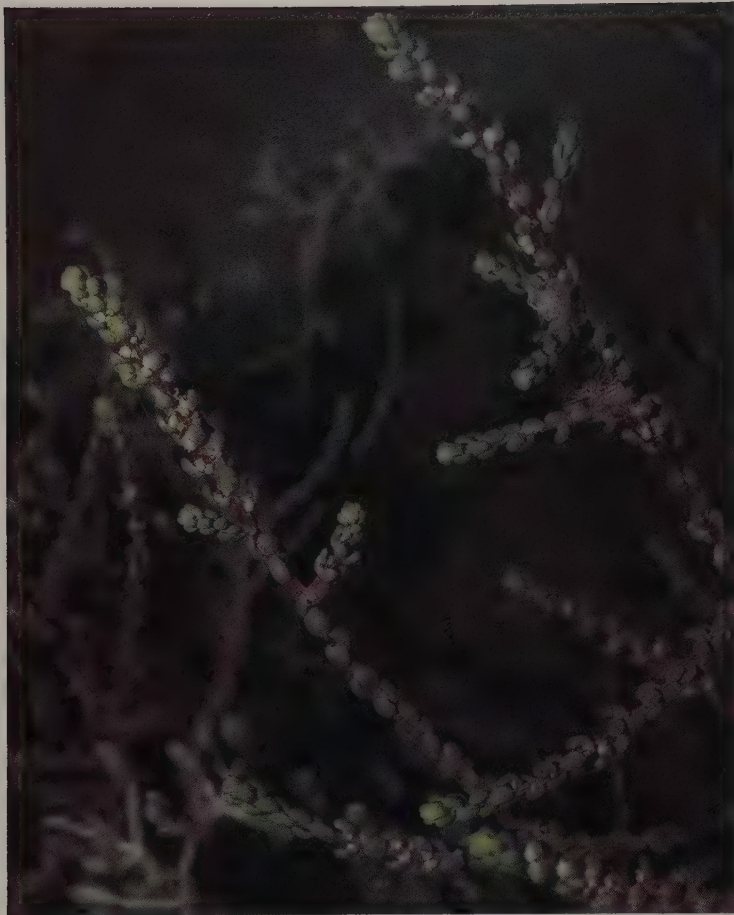
Between new Jiddah Airport and Madinah road, Jiddah; in a shallow sandy ditch. 20 ft.



Suaeda monoica ▲

A bushy shrub 1 m tall with narrow succulent leaves; flowers consisting of five pairs of orange anthers carried on a thin pale green fleshy receptacle 4 mm wide; no scent.

Near the sewage works 10 km south of Jiddah; in saline sand at edge of lagoon. 2 ft.



Suaeda pruinos ◆

A sprawling shrublet with stems 30 cm long and small fleshy leaves 3 mm long pressed close to the stem; greenish fleshy flowers 2 mm wide; no scent.

Near the sewage works, 10 km south of Jiddah; in saline sand at edge of lagoon. 2 ft.



Suaeda* cf. *vermiculata ◆

A bushy woody-stemmed herb with tiny oval succulent leaves; pale greenish flowers 3 mm wide.

Near Riyadh al Khabra, SW of Buraydah; by the roadside. 2,000 ft.

***Suaeda* sp. 1058** ◆

A bushy woody-based herb 25 cm high with cylindrical succulent leaves; succulent greenish flowers 2 mm wide, in clusters.

Between new Jiddah Airport and Madinah road, Jiddah; in a shallow sandy ditch. 20 ft.



Suaeda schimperi ◆

A bushy woody-based herb 25 cm high with cylindrical succulent leaves; succulent pale green flowers 2 mm wide, clustered at the tips of the stems.

Between new Jiddah Airport and Madinah road, Jiddah; in a shallow sandy ditch. 20 ft.





***Suaeda* sp. 3841** ♣

A bushy succulent-leaved herb with stems 40 cm long and with purplish leaves; flowers consisting of yellow stamens arising from clustered fleshy bodies, along the apical portion of the stem. The plant dries black.

Near Harrat Khaybar Camp (25° 41'N, 39° 57'E); in drifted sand at edge of lava flow. 5,700 ft.



Traganum undatum ♣

A bushy white-stemmed shrublet 40 cm tall with oval reddish succulent leaves which end in a spiny tip; in fruit?, the fruits buried in white woolly hairs in fat fleshy bodies, in clusters.

Turayf Camp (32° 40'N, 39° 29'E); in shallow sandy run-off on limestone plateau. 2,900 ft.

CISTACEAE

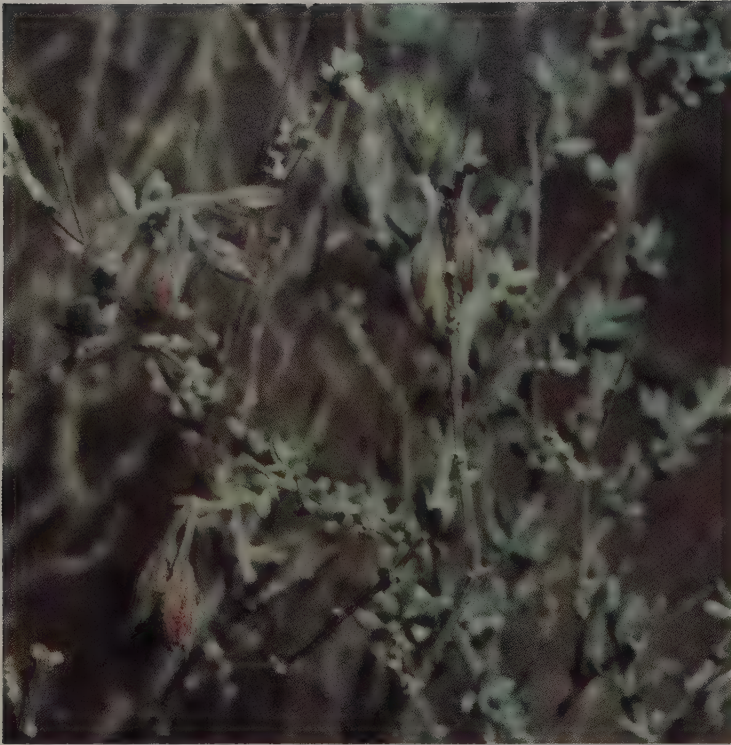
Four small shrubs and two annuals have been found by the author, though *Helianthemum lippii* is so variable in leaf and flower size that it can be mistaken for more than one species.

◆ ***Fumana arabica***

A straggly woody herb with crowded narrow dark green leaves and stems 20 cm long; in bud and fruit and with one dead yellow flower; the fruit a three-part capsule cupped in a long slender calyx; non aromatic.

Jabal Warjan, 60 km SW of Madinah; on summit of col, in a shady crevice. 6,800 ft.





Helianthemum kahiricum ◆

A bushy twiggily shrublet 30 cm tall with tiny greyish leaves with rolled edges; in bud and fruit, with fairly long pedicels.

Aban al Ahmar, a granite massif 143 km SW of Buraydah; among rocks. 4,200 ft.



Helianthemum ledifolium ◆

An erect annual herb 18 cm high; yellow flowers 1 cm wide on short stalks. Locally abundant.

Near Zabirah, 200 km north of Buraydah; in firm sand at edge of a limestone outcrop. 1,600 ft.



Helianthemum lippii ◆◆

A white stemmed bushy shrublet 15 cm high with small narrow greyish leaves; yellow flowers 6 mm wide; no scent. A widespread variable plant.

Near Turayf Camp (31° 40'N, 39° 29'E); in shallow sandy runnel over limestone plateau. 2,900 ft.



Helianthemum salicifolium ◆

An annual herb with green stems 10 cm long and broad leaves; yellow flowers 1 cm wide on long upturned stalks.

180 km east of Thaniyat Camp (29° 46' N, 37° 58' E); in shallow sand over limestone outcrop. 2,500 ft.



Helianthemum stipulatum ◆

A straggly leafy woody-based herb with stems to 30 cm long; pale yellow flowers 9 mm wide. Similar to *H. lippii* but with larger flowers, green stems and more straggly.

Aban al Ahmar, a granite massif 143 km SW of Buraydah; among rocks on the summit. 4,200 ft.

COMBRETACEAE

There are three representatives of this family in Saudi Arabia and two are trees. *Combretum molle* is found along the Asir and south Hijaz escarpment, but *C. aculeatum* and *Terminalia* have been found only near the Yemen border.

◆ ***Combretum aculeatum***

A tangled many-branched vine with stems to several metres long and with entire leaves in short tufted spikes; white and reddish flowers 1 cm wide subtended by reddish bracts, in short spikes; scarlet flushed four-winged fruits 2.5 cm long.

At the base of a granite pluton 17 km NE of Shoqaiq junction, Ad Darb-Muhayl road; climbing over *Hyphaene* palms in a sandy wadi. 100 ft.





Combretum molle ◆ ◆

A dark-green-leaved tree 6 m high; tiny greenish flowers, in tassels 7 cm long; sweet scent. The pale green fruits, 2 cm long by 1.8 cm wide, have four wings.

Near the top of the escarpment, Jiddah-Taif road; on a steep rocky hillside. 4,600 ft.



Terminalia brownii ◆ ◆

A slender spire-shaped tree 6 m tall; white flowers 6 mm wide, in erect tassels 6 cm long; sweet scent. Reddish-purple fruits encircled by a wide wing. Widespread locally on the SW side of the mountain.

Jabal Fayfa, 100 km NE of Jizan; on steep SW approach road, between terraced fields and on rather barren hillsides. 4,000 ft.



COMMELINACEAE

This small family of grass-like herbs has fairly large, very short-lived fragile blooms that die before noon. Although the plants

are not succulent in appearance like the cacti, they can take six weeks or more to dry in a press.



◆ ***Commelina albescens***

A prostrate leafy herb with stems 15 cm long and narrow glaucous prominently veined leaves; very pale blue flowers 7 mm wide.

Wadi al Uss, in the western slope of Jabal Sawdah, NW of Abha; in hard sand at the edge of a wooded ravine. 3,200 ft.



◆ ***Commelina africana* var. *villosior*** ◆

A leafy herb with stems to 10 cm long; pale yellow flowers 1.2 cm wide.

Tannumah, 12 km south of An Nimas, Jiddah-Abha road; in damp sand by a stream. 6,500 ft.

◆ ***Commelina* sp. aff. *albescens***

A weak-stemmed scrambling leafy herb 30 cm tall, pale bluish-lilac flowers 1.2 cm wide; the leaves are not as glaucous nor as strongly veined as in *C. albescens*.

Between Mudhaylif and Muhayl, Jiddah-Jizan road; among low bushes. 1,300 ft.





◆ ***Commelina benghalensis***

A creeping leafy herb with stems 30 cm long and leaves softly downy; bright blue flowers 1 cm wide.

One third of the way up the escarpment, Taif-Jiddah road; by the roadside. 3,500 ft.



◆ ***Commelina forsskahlei***

A semi-prostrate herb with stems 25 cm long and narrow glabrous leaves; bright blue flowers 1 cm wide. Widespread in the southern mountains.

Wadi Kharar, a granite ravine near the foot of the escarpment, Jiddah-Taif road; among rocks. 1,500 ft.



◆ ***Cyanotis nyctitropa***

A tufted leafy grass-like herb, leaves with hairy margins, and stems to 10 cm long; bluish-lilac flowers 1 cm wide, which have erect protruding bright blue stamens with fluffy filaments. Summer flowering.

Wadi al Uss, on the western slope of Jabal Sawdah, 25 km NW of Abha; in the gravel of an old river level in a wooded valley. 3,200 ft.

COMPOSITAE

This family, one of the largest in the world with some 25,000 species, is vying with Leguminosae in the number of species collected so far in Saudi Arabia; if species from the extreme eastern region were included there would be several more. Many of the species are either shrubs or herbs, but there is at least one tree, *Tarchonanthus*, and three succulents, all species of *Kleinia*. Almost all members of the family are fairly easily recognized by a distinctive and characteristic feature; the head-like inflorescence known as a capitulum. This is made up of numerous small individual flowers known as florets and the whole resembles a single flower and biologically functions as such. In *Xanthium* male and female florets are found in separate

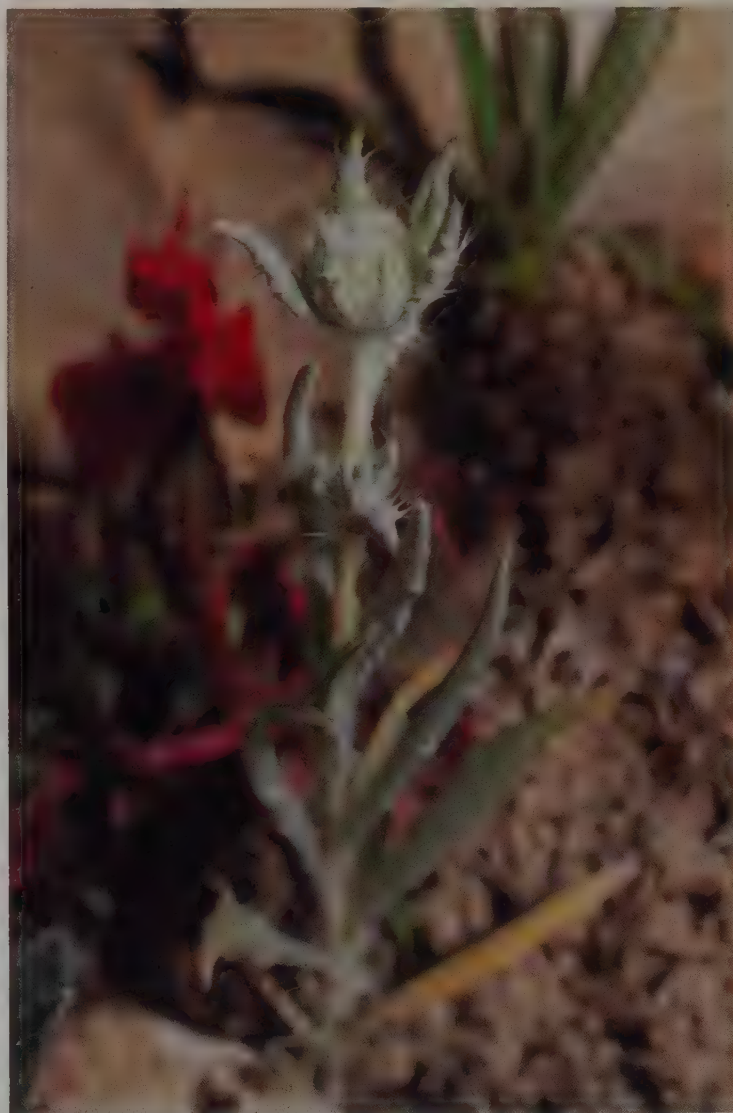
capitula on the same plant. The male florets are in orbicular heads above the two female which are enclosed within a fused involucre covered in hooked bristles; only the styles protrude; they are wind pollinated and the fruits dispersed by the burrs clinging to animals. In the text the term 'flower' refers to each capitulum. Sometimes the fused petals of the outer florets are extended and resemble a single large petal and these are known as ray florets. Many of the species are hard to distinguish one from another within their genera, *Anthemis* and *Picris* being two examples, and until more is known of the Arabian flora it is difficult to assign specific names.



***Aaronsohnia factorovskyi* ◆**

An erect herb branching from the base; flower stems 12 cm long; yellow 'button' flowers 8 mm wide; non-aromatic. Widespread in the north.

Jabal Qutn, 15 km NE of Uqlat as Suqur, off the Madinah-Qassim road; in hard sand at the base of a granite outcrop. 3,000 ft.



***Acantholepis orientalis* ◆**

An erect herb 15 cm tall with narrow downy leaves having a few prickles; fawn bud-like flowers in a rounded flattened head 1 cm wide.

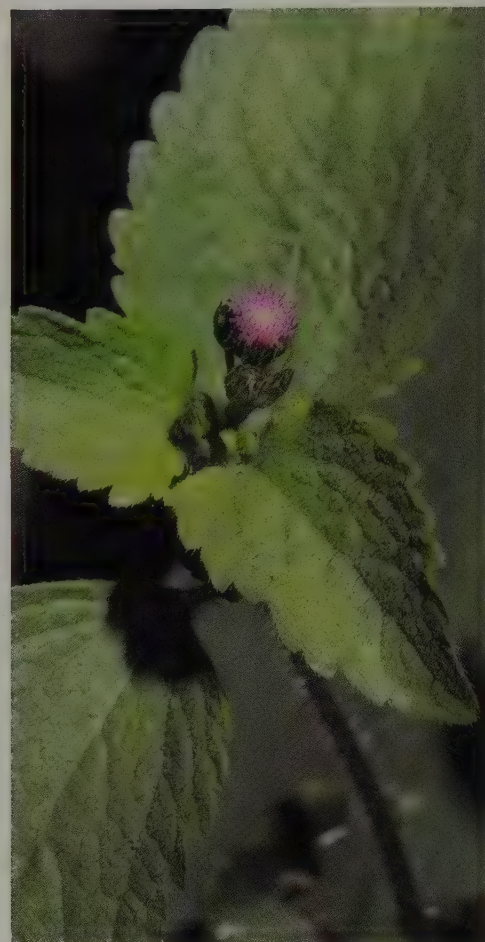
40 km NW of Turayf Camp (31° 40' N, 39° 29' E); growing through a small bush in a sandy runnel on a limestone plateau. 2,900 ft.



◆ ***Achillea biebersteinii***

An erect leafy herb 35 cm tall branching from the base and with feathery grey-green leaves; almost flat heads 9 cm wide of tiny deep yellow flowers; very aromatic. Widespread in the southern mountains especially near cultivated ground; usually growing in colonies.

Near Al Bahah, on the Taif-Abha road; in a fallow field. 6,800 ft.



◆ ***Ageratum conyzoides***

A large-leaved slightly hairy herb 18 cm high; pale bluish lilac flowers 7 mm wide; faintly aromatic.

Al Aridah, near the Yemen border ENE of Jizan; at the edge of a grove of *Pandanus*, in sand. 800 ft.



◆ ***Ambrosia maritima***

A very bushy leafy herb 75 cm high with thick stems; pale yellowish flowers 5 mm wide, in spikes; very strongly aromatic. Widespread in scattered localities in the southern mountains, especially around Aqiq.

60 km south of Baljurshi, on the Taif-Abha road; in a fallow field near a dry wadi. 6,500 ft.



◆ ***Achillea fragrantissima***

An erect blue-green very bushy shrublet 45 cm high; narrow yellow flowers 3 mm wide, in clustered heads. Very widespread in certain localities in the north, sometimes forming almost pure stands.

Near Zabirah, 200 km north of Buraydah; in a large claypan in a wide sandy wadi. 1,800 ft.

Anthemis deserti ♦

A crowded-stemmed bushy leafy herb 13 cm high with downy grey-green leaves; white flowers 2.5 cm wide; aromatic. Widespread in the north.

Near Zabirah, 200 km north of Buraydah; among red sand dunes. 1,800 ft.

***Anthemis pseudocotula*** ♦

A semi-prostrate densely leafy herb with stems 25 cm long and bright dark green very feathery leaves; white flowers 2 cm wide; a rather sour aroma. Abundant in the Abha area.

Near Suqal Ithnayn, 58 km SE of Abha; near cultivation, in a sandstone ravine. 7,500 ft.

***Anthemis* sp. 3562** ♦

An erect bushy herb with pale green dissected leaves; white flowers 2.3 cm wide; faint camomile-like scent.

A red granite mountain, 44 km south of Baljurshi; in gravel. 6,500 ft.





Anvillea garcinii ◆◆

A stout bushy leafy shrublet 25 cm high; yellow flowers 1.5 cm wide, with no ray florets above; no scent. Widespread especially in the north. This species has a distinctive form with large ray florets below, the flowers being up to 4 cm wide. The author has never found intermediate forms nor the two forms growing together.

Wadi Sabha, near Zabirah, 200 km north of Buraydah; in a shallow rocky wadi on the limestone escarpment. 2,000 ft.



Artemisia judaica ◆

A bushy shrublet 60 cm high with pale grey leaves, the upper ones tiny, the lower wide and deeply lobed; yellow flowers 4 mm wide, in terminal spikes; strongly aromatic.

50 km NW of Thaniyat Camp, south of Turayf; in ravine in sandstone. 2,700 ft.



Artemisia abyssinica ◆

An erect leafy herb 60 cm high branching from the base and with feathery leaves; brown bud-like flowers 3 mm wide; very aromatic.

Near the waterfall beauty-spot between Abha and Jabal Sawdah; in damp sand by the stream. 8,500 ft.





Artemisia monosperma ◆

A very bushy leafy shrublet to 1 m high with narrow simple leaves; the flower spikes have tiny green bracts and round green bud-like flowers 1 mm wide; aromatic. Autumn flowering. Very widespread locally among sand dunes.

Near Zabirah, 200 km north of Buraydah; among the red sand dunes. 1,800 ft.



Artemisia sieberi ◆

An erect densely bushy delicate-stemmed shrublet 60 cm high; grey-green young shoots and feathery leaves; tiny brownish bud-like flowers 1 mm wide; very aromatic. Summer flowering. Locally widespread.

Near Zabirah, 200 km north of Buraydah; in a wide scrub-filled wadi. 1,800 ft.



Artemisia scoparia ◆

A bright green erect branching spire-shaped annual herb 35 cm tall with brown ridged stems and small deeply lobed leaves clasping the stem; in bud, the buds less than 1 mm wide; non aromatic. Similar to *A. monosperma* which has white stems and long narrow leaves.

70 km due east of Turayf Camp (31° 40' N, 39° 29' E); in a claypan on a limestone plateau. 2,900 ft.



Aster squamatus ◆

An erect branching spire-shaped herb 1 m tall with small narrow leaves; not wide-opening blue flowers 4 mm wide; no scent.

Mahalla reservoir, near Abha; in damp sand near the stream. 6,000 ft.



Asteriscus graveolens ◆

A branching woody herb 30 cm high with pale stems and narrow downy dentate leaves; yellow flowers 2.5 cm wide with short ray florets and surrounded by leafy bracts; very aromatic.

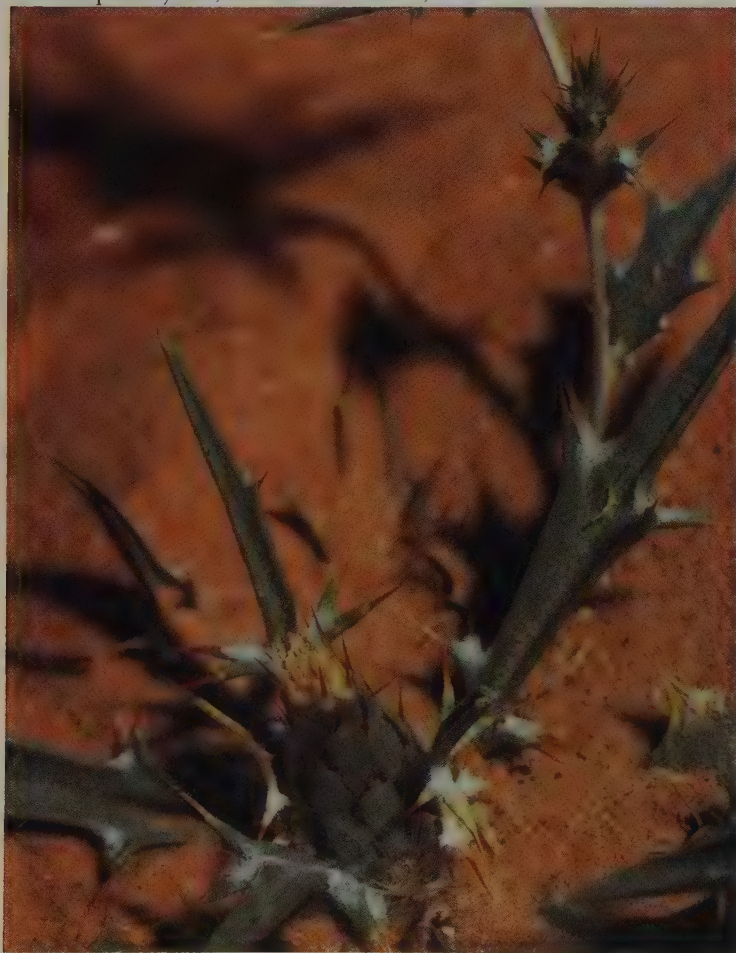
Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; on the summit of a steep rocky hill, in a rock crevice. 3,000 ft.



Asteriscus pygmaeus ◆

A dwarf leafy herb branching from the base, the slightly hairy leaves in rosettes; yellow flowers 1 cm wide; no scent. Very widespread in scattered localities in the north.

Jabal Qutn, 15 km NE of Uqlat as Suqur, off the Madinah-Qassim road; in a rock crevice at the base of a large granite outcrop. 3,000 ft.



Atractylis arabica ◆

A very slender-stemmed branching prostrate herb with stems to 18 cm long and thistle-like spiny leaves, the spines chestnut-brown and with white hairy 'wool' in the angles of the leaf lobes; bud-like white flowers, not wide-opening, 1.8 cm long and 8 mm wide; bracts tipped with chestnut spines.

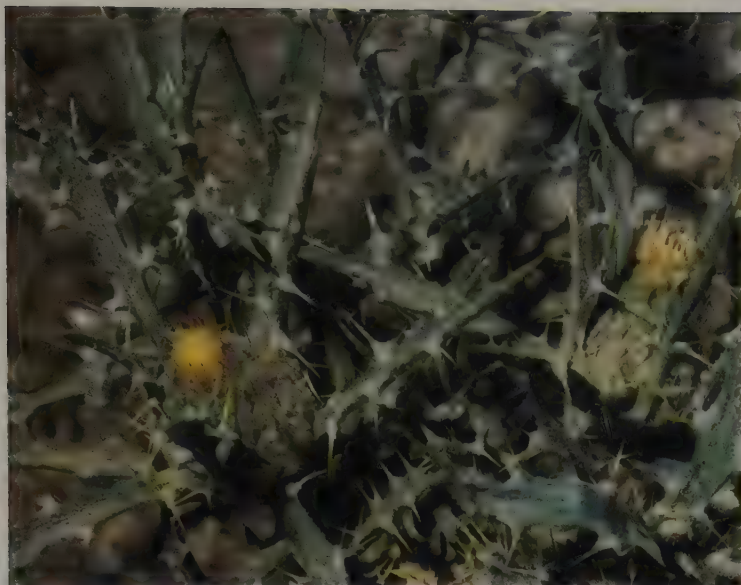
Near Zabirah, 200 km north of Buraydah; in drifted sand in a wide wadi. 1,800 ft.



Atractylis cancellata ◆

A branching stemmy semi-prostrate herb with stems to 20 cm long and having rather small leaves and many short spines; slender curved spiny bracts encircle the fat spherical flowers, which are pale purple and not wide-opening, 7 mm wide. Locally widespread, especially in the north.

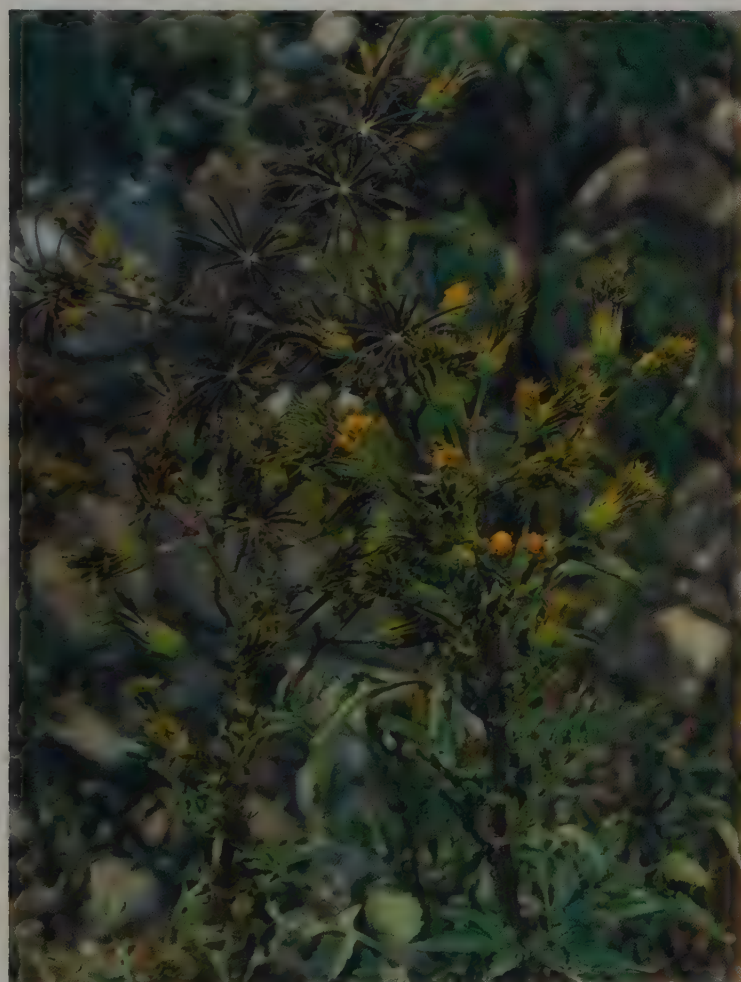
Jabal Tamiyah, a flat-topped sandstone mountain SW of Uqlat as Suqur, off the Madinah-Qassim road; in crevices on the sandstone plateau. 4,450 ft.



Atractylis carduus ♣

A fairly stout semi-prostrate leafy herb with stems 10 cm long and thistle-like leaves tipped with straw-coloured spines; small patches of white 'wool' at the base of the spines; fat bud-like pale yellow flowers, not wide-opening, 8 mm wide. A widespread plant but not common in the south.

Near Nabhaniyah, 100 km SW of Buraydah; in hard sand. 2,300 ft.



Bidens biternata ♣

A rather straggly erect leafy herb to 75 cm high; small yellow flowers 4 mm wide; fruit elongated with pitchfork-like apical spines 2 cm long; no scent. Fairly widespread in the south, flowering mainly in the summer.

Wadi Kharar, near the foot of the escarpment, Jiddah-Taif road; among boulders in a steep ravine. 1,500 ft.



Blumea aurita ♣

A wide densely bushy bright green herb 1 m tall with lobed dentate leaves; very narrow not wide-opening lilac flowers 4 mm wide; strongly unpleasantly aromatic.

Wadi Mansa'ah, a tributary of Wadi Al Lith, 200 km south of Jiddah; in damp sand by a pool in the wadi bed. 500 ft.



Blumea bovei ♣

A slender branching herb to 50 cm high; lilac flowers 5 mm wide; non-aromatic. Fairly widespread near water.

Near the New Dam, Najran; in damp sand at the edge of the river. 4,500 ft.



Blumea gariepina ♣

A spire-shaped many-branched woody-based herb 1 m high; the entire plant is slightly downy and the stems have three or four green wings along them; not wide-opening yellow flowers 5 mm wide; very aromatic; drought resistant and not grazed.

Near Jabal Manfah, 55 km north of Najran on the Abha road; in hard sand near the road, on a wide sandy plain. 6,200 ft.



Calendula arvensis ♣

A branching semi-prostrate leafy herb with stems 25 cm long; orange flowers 8 mm wide with a darker centre; aromatic. A very widespread herb, the flower colour and size somewhat variable, but unlike the next species, the hard curved fruits have no wings.

10 km SW of Al Hadda, on the road to the red mountain; in a fallow field, in damp sand. 6,800 ft.



Calendula tripterocarpa ♣

A rather straggly leafy branching herb with stems 20 cm long; yellow flowers 1 cm wide; the curved fruits have slightly frilled wings. Fairly widespread especially in the north.

Near Uqlat as Suqur, off the Madinah-Qassim road; among rocks of a small outcrop. 2,800 ft.



Carduus getulus ♣

A dwarf plant with a rosette of large prickly leaves; clusters of rosy-lilac flowers 8 mm wide, on short stems 4 cm long; no scent.

25 km north of Qiba and 180 km north of Buraydah; in a shallow sandy wadi near the limestone escarpment. 1,500 ft.



Carduus pycnocephalus ◆

An erect branching prickly herb to 1 m high with spiny slightly winged stems; deep rosy-pink flowers 8 mm wide; sweet scent.

Wadi Sabha, near Zabirah, 200 km north of Buraydah; among *Ziziphus* bushes in a scrub-filled wadi. 1,800 ft.



Carthamus oxyacantha ◆

A grazed erect prickly-leaved branching herb 60 cm high with pale stout stems; the bright green leaves are shiny and have numerous golden yellow spines. The single flowering specimen collected had a flower head with only three yellow florets 1 cm long; no scent. Summer flowering.

20 km north of Qiba and 180 km north of Buraydah; in a shallow sandy wadi near the edge of the limestone escarpment. 1,500 ft.



Carthamus nitidus ◆

An erect sparsely branching white stemmed prickly herb (dead) to 75 cm tall; in fruit; fluffy fruiting heads 1.5 cm wide, cupped by spiny bracts, the median bracts having a spiny margined white apical appendage.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; on an andesite spur on the northwestern side. 5,500 ft.



Centaurea ammocyanus ◆

A branching herb with semi-prostrate greyish stems to 18 cm long and having narrow lobed grey leaves; bright pink flowers 1.8 cm wide, the involucre having purple bracts fringed with white hairs; no scent.

A volcano 60 km west of Turayf Camp (31° 40'N, 39° 29'E); in volcanic gravel inside crater. 3,000 ft.



◆ *Centaurea eryngioides*

An erect herb with stems to 30 cm long, the base white cotton-downy and with a basal rosette of dark green deeply lobed leaves having small white hairs; deep pink flowers 5 cm wide, the spine-tipped bracts of the involucre having white coarse-hairy margins; spicy scent.

West of Shiqri, off the Tabuk road; in clefts of deep granite ravine. 2,500 ft.



◆ *Centaurea mesopotamica*

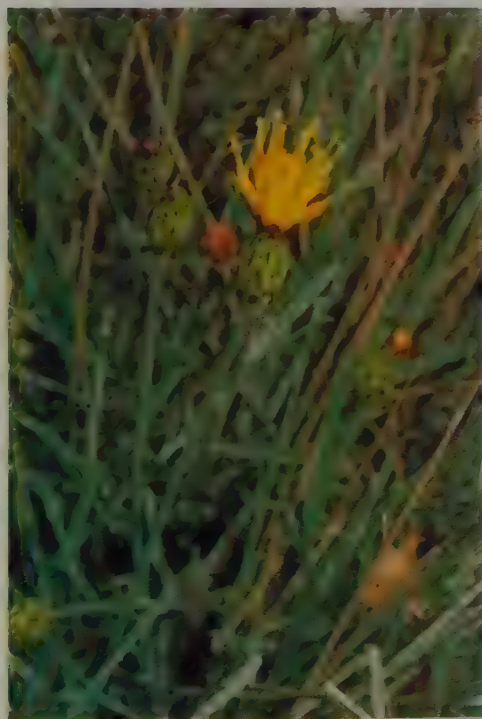
A prostrate slightly branching herb with stems to 35 cm long; the entire plant, especially the buds, short white-hairy; pale yellow flowers 1.5 cm wide; sweet scent.

Jabal Qutn, 15 km NE of Uqlat as Suqur, off the Madinah-Qassim road; in hard sand near a large granite outcrop. 3,000 ft.

◆ *Centaurea pseudosinaica*

A branching spreading semi-prostrate herb with winged stems 30 cm long; flowers and calyx with very long spines; rest of the plant with only very short soft prickles; yellow flowers 2 cm wide; sweet scent. Locally abundant, especially in the north.

Near Uqlat as Suqur, off the Madinah-Qassim road; in hard sand among rocky outcrops. 2,800 ft.



◆ *Centaurea schimperi*

A grazed bushy twiggy shrublet 35 cm high with tiny grey leaves; narrow yellow flowers 1.2 cm wide; no scent. Abundant around Abha. In the north it can grow into a bush 40 cm tall, and the flowers are sometimes white tipped with yellow.

Near Bani Rizam, 18 km north of Abha on the Taif road; on a rocky hillside. 7,500 ft.





Centaurea scoparia ▲

A neat bushy shrublet 40 cm tall with narrow, lobed, grey-green lower leaves and simple upper leaves; pale yellow flowers 2 cm wide, the involucre with curved spines; sweet scent.

100 km NW of Thaniyat Camp (29° 46'N, 37° 58'E); in a ravine in sandstone. 2,700 ft.

Centaurea* cf. *sinaica ◆

A branching herb to 50 cm tall, the dentate leaves having wide auricles clasping the stem; pale creamy yellow flowers 1.7 cm wide, the spines on the involucre having five or more hairs; sweet scent.

Near Jabal Ibrahim, off the Taif-Al Bahah road; on a rocky hillside. 6,000 ft.



Centaurea sinaica ▲

A dwarf herb with deeply dissected leaves and stem 4 cm long; pale creamy flowers 2 cm wide; sweet scent. It is difficult to differentiate in the field between this species and *C. pseudosinaica*, except for the deeply dissected crisped basal rosette leaves of the former.

A volcano 60 km west of Turayf Camp (31° 40'N, 39° 29'E); in volcanic gravel inside crater. 3,000 ft.

Centaurea solstitialis* ssp. *solstitialis ◆

A branched slightly downy herb 1 m high with wide green wings along the stems and spiny flower heads; deep yellow flowers 2 cm wide; no scent.

Near the New Dam, Najran; among rocks on the river bank. 4,500 ft.





Centaurothamnus maximus ◆

A wide many-branched leafy shrub 1.5 m tall, the leaves having a white under surface; magenta flowers 4 cm wide; faint sweet scent.

Between Jabal Ibrahim and Al Bahah, off the Taif-Abha road; on a cliff on the lip of the escarpment. 7,000 ft.



Cichorium bottae ◆

A grazed, leafy 'cushion' herb 12 cm wide; sky-blue flowers 1.8 cm wide; no scent. A very widespread plant in the Asir, mostly seen as a grazed 'cushion' herb. Under protected conditions the erect branched flower spikes are 10 cm tall.

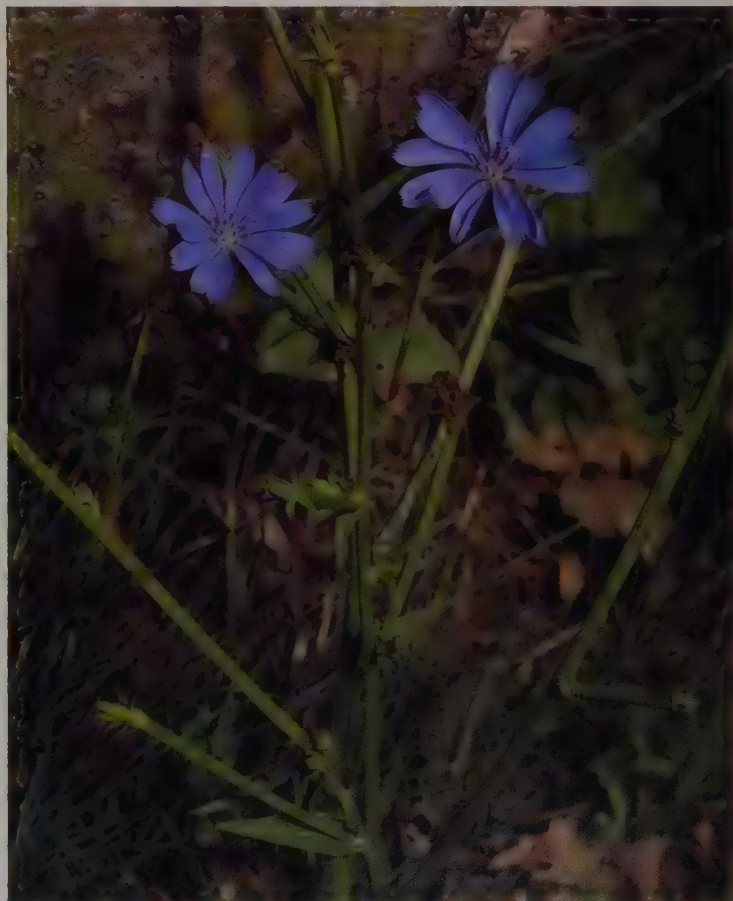
Jabal Sawdah, on the Ring Road from Abha to Taif; on a bank in a field. 8,500 ft.



Cineraria abyssinica ◆

An erect branching herb 35 cm tall with almost orbicular slightly lobed dentate leaves; not wide-opening yellow flowers 4 mm wide with short ray florets; non aromatic.

13 km NW of Abha, Jabal Sawdah road; in damp sand near a well. 8,500 ft.



Cichorium intybus ◆

A grazed herb with leafy base and stout erect stems 60 cm high; sky-blue flowers 1.5 cm wide; no scent.

Near Al Hadda, off the Jiddah-Taif road; in hard sand near cultivation. 6,500 ft.



Cirsium vulgare ♣

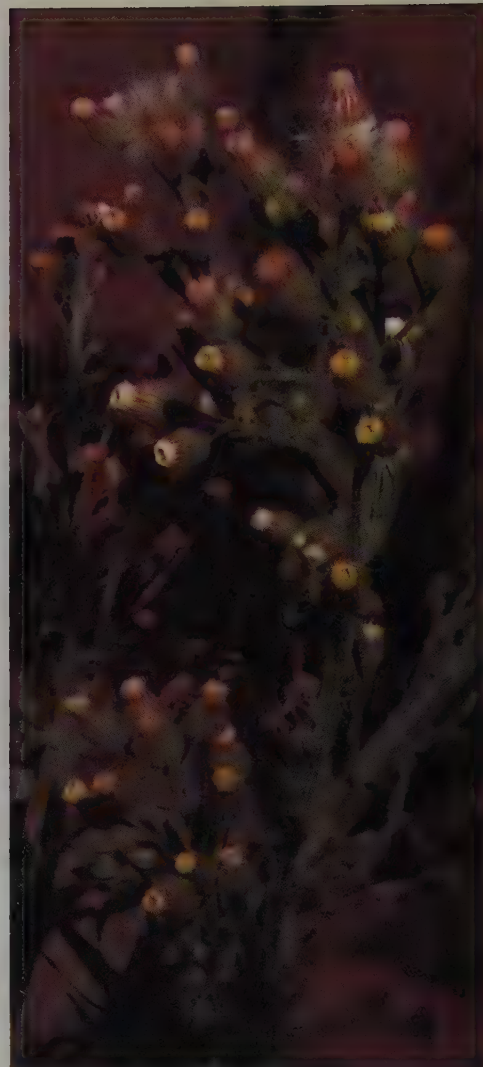
An erect very spiny branching leafy herb 1 m high, with only short spines on the involucre; magenta flowers 2 cm wide; sweet scent.

Near the waterfall beauty-spot between Abha and Jabal Sawdah; in damp sand near the stream. 8,500 ft.

Conyza bonariensis ♦

A woody-based grazed herb 15 cm high; not wide-opening pale yellow flowers 5 mm wide; non-aromatic. A fairly widespread weed in the southern mountains.

Najran; in a fallow field by the Emir's Palace. 4,500 ft.



Cnicus benedictus ♣

A sparsely branched dwarf herb with a rosette of very large white-hairy leaves; pale yellow flowers 1.2 cm wide, on a very short stem; no scent. Fairly widespread in fallow fields in the southern mountains.

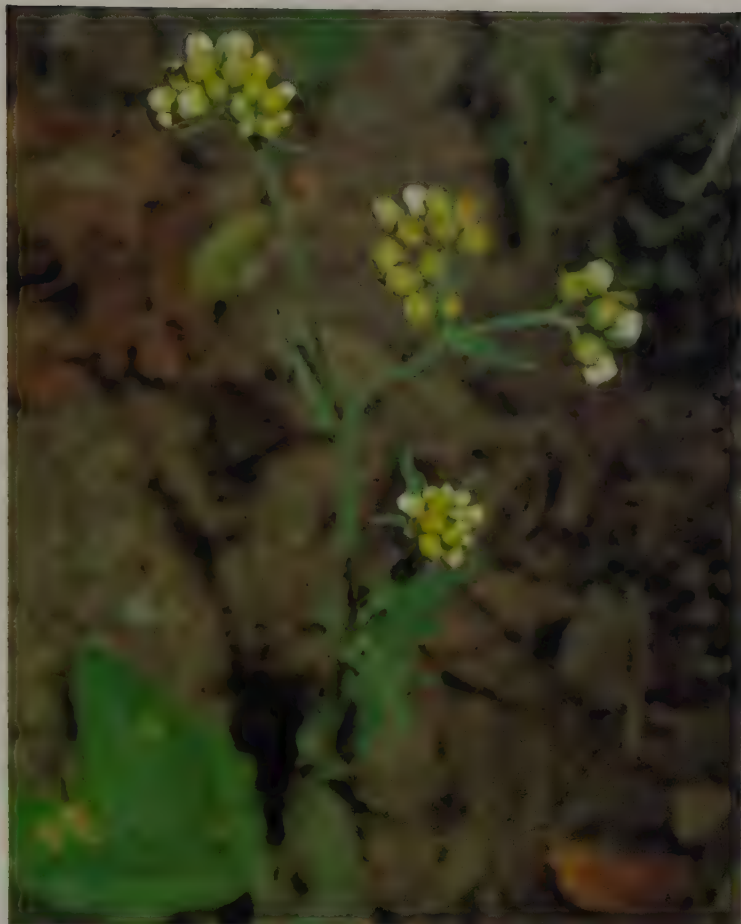
Near Al Bahah, on the Taif-Abha road; in a fallow field. 6,800 ft.

Conyza gouanii ♦

An erect single-stemmed herb 20 cm tall with a few small leaves along the stem; not wide-opening creamy flowers 5 mm wide, no scent.

The waterfall beauty-spot between Abha and Jabal Sawdah; in water at edge of stream. 8,500 ft.





Conyza hochstetteri ◆

An erect slightly branching soft-hairy leafy herb 60 cm high; crowded inflorescence of up to 15 not wide-opening, yellow flowers 6 mm wide; no scent.

Near Suq al Ithnayn, 58 km SE of Abha; in a ravine on the sandstone plateau. 7,800 ft.



Conyza incana ◆

A slender-stemmed bushy woody herb 1 m high with small grey-green leaves; clusters of small, not wide-opening yellow flowers 4 mm wide; aromatic.

Near the waterfall beauty-spot between Abha and Jabal Sawdah; among rocks near the stream. 8,500 ft.



Conyza pyrrhopappa ◆

A wide bushy leafy shrublet 1 m high, the aromatic leaves having sunken veins; not wide-opening yellow flowers 5 mm wide, in loose flat heads 7 cm wide; no scent.

Near Al Bahah, off the Taif-Abha road; in damp sand on bank of a narrow wadi. 6,500 ft.



Conyza stricta ◆

An erect bushy leafy herb 45 cm high with deeply lobed leaves; clusters of small, not wide-opening yellow flowers 3 mm wide; no scent. Widespread in mountains, especially in the south.

10 km SW of Al Hadda, Taif-Jiddah road, on the road to the red mountain; in a fallow field. 6,800 ft.



Crassocephalum bojeri ◀

A juicy weak-stemmed herb with stems to 5 m long and lobed leaves, the terminal lobe arrow-shaped; not wide-opening yellow flowers 6 mm wide, in heads grouped in terminal racemes; sweet scent.

Jabal Fayfa, 100 km NE of Jizan; on rocky well-vegetated hillside, climbing through an acacia. 5,200 ft.



Crepis foetida ◀

A half-procumbent-stemmed herb with a basal rosette of dandelion-like leaves and hairy stems 15 cm long; soft-spiny involucre; yellow flowers 1 cm wide with a brownish centre; no scent.

Near the head of the Grandi Lavori road, 5 km south of Baljurshi; on a steep rocky slope by the lip of the escarpment. 7,000 ft.



Crepis ruepellii ◀

A branching leafy-based herb with stems to 60 cm tall; milky juice; yellow flowers 1.5 cm wide; no scent. The calyx has distinctive blackish ridges.

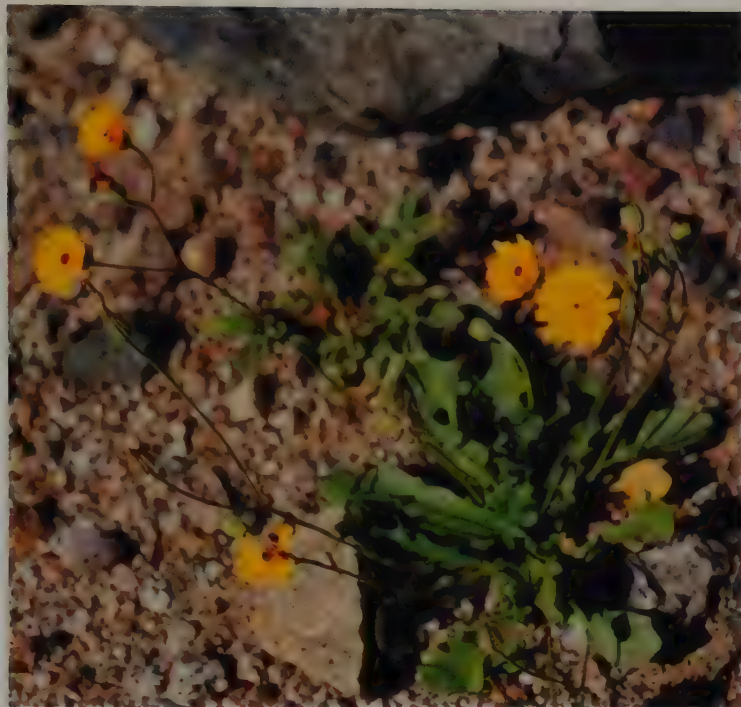
Near Suq al Ithnayn, 58 km SE of Abha; in a shallow ravine on the sandstone plateau. 7,800 ft.



Crepis sancta ◀

A single-stemmed herb with a basal rosette of leaves and flower stem 13 cm long; pale yellow flowers 1.5 cm wide; no scent.

Wadi Mahra, 82 km south of Baljurshi on the Taif-Abha road; in a grassy valley near the stream. 7,000 ft.



***Crepis* sp. ♣**

A slender-stemmed herb with a basal rosette of leaves and branching flower stems 15 cm long; yellow flowers 1.5 cm wide; no scent.

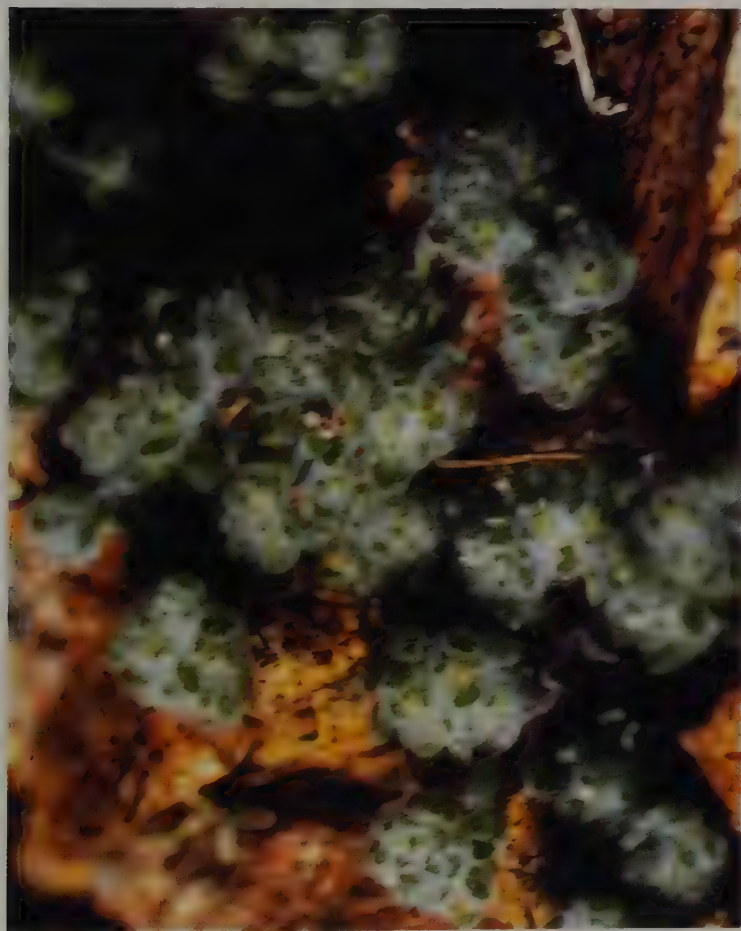
Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; in granite sand in a valley on SW side. 1,800 ft.



***Dichrocephala chrysanthemifolia* ♣**

An erect sparsely branching herb 15 cm high; pale greenish flowers in spherical heads 7 mm wide; no scent. Locally fairly widespread.

Near Suq al Ithnayn, 58 km SE of Abha; among junipers and boulders on the lip of the escarpment. 7,900 ft.



***Cymbolaena griffithii* ♣**

A dwarf grey-green herb with crowded stems 3 cm long; tiny flowers in very woolly spherical clusters 1 cm wide.

Jabal Shar, a granite massif 120 km SW of Tabuk; among rocks near the summit. 5,000 ft.



***Dicoma tomentosa* ♣**

A woody sparsely branching herb with stems to 22 cm long and having narrow downy greyish leaves; pale creamy flowers 7 mm wide; no scent.

Headwaters of Wadi Mansa'ah, a tributary of Wadi Al Lith, 200 km south of Jiddah; on steep rocky hillside. 2,000 ft.



Echinops glaberrimus ▲

An erect branching spiny-leaved herb 1 m high; in bud; all spines on leaves and buds are lemon-yellow.

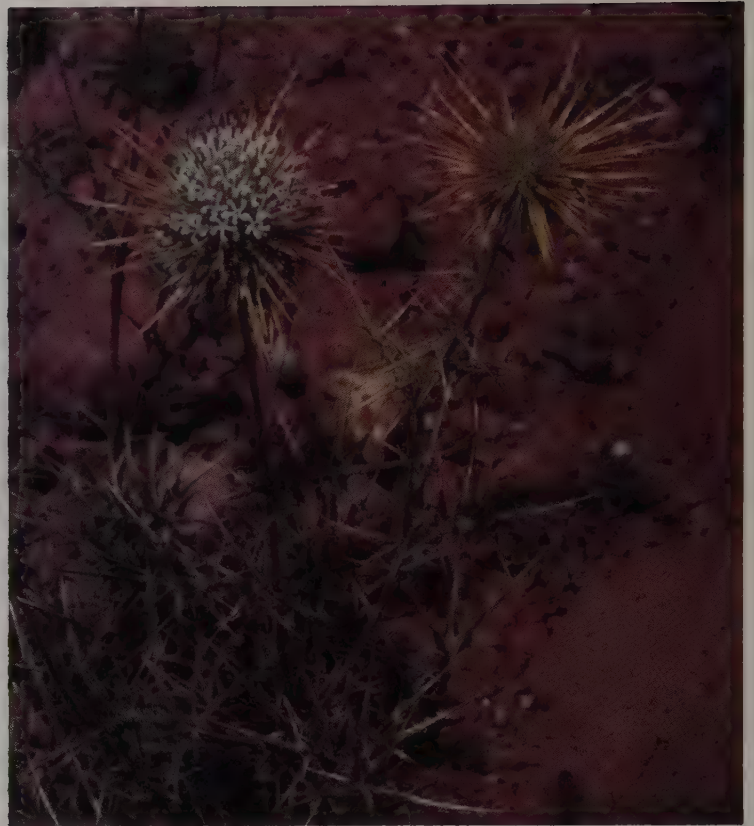
Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; in a rocky ravine. 5,500 ft.



Echinops viscosus ▲

An erect branching red-stemmed prickly-leaved herb 1 m high, the leaves having whitish veins; white flowers in spherical heads 4 cm wide, the spines not extending beyond the open flowers; no scent. Locally widespread; colour somewhat variable.

Jabal Qutn, 15 km NE of Uqlat as Suqur, off the Madinah-Qassim road; in a crevice of a granite outcrop. 3,000 ft.



Echinops spinosissimus ▲

An erect branching spiny-leaved herb 1 m high, the underside of the leaves having white felted hairs; white flowers in spherical heads 4 cm wide, the very long spines extending beyond the flowers. Locally widespread.

Between Abha and Talhah, on the road to Najran; among rocks by the roadside. 6,500 ft.



***Echinops* sp. 1570** ▲

An erect branching spiny-leaved herb 1 m high; very pale blue flowers in spherical heads 4 cm wide; faint sweet scent; the spines do not extend beyond the open flowers and the stems are pale brownish. Locally widespread.

Wadi Fatimah, 25 km SW of Jumum; on a low rocky hillside. 500 ft.



***Echinops* sp. 3761** ◀

An erect branching spiny herb 2 m tall with very dissected leaves; white flowers in spherical heads 8 cm wide, with no protruding spines. Widespread in scattered localities between Tannumah and Abha.

Tannumah, 12 km south of An Nimas, Taif-Abha road; on sandy bank near river. 6,500 ft.



Eclipta alba ◀

A branching leafy herb with stems 25 cm long; white flowers 7 mm wide; no scent. Fairly widespread but nowhere abundant, near water.

Wadi Kharar, near the foot of the escarpment. Jiddah-Taif road; in damp sand in stream bed in steep rocky ravine. 1,500 ft.



***Echinops* sp. 4116** ◀

A very bushy leafy prickly herb to 1 m tall and 1 m wide with smooth grey stems and narrow grey leaves felted on both surfaces and armed with yellow spines; in bud, the oval heads 3 cm long. Locally widespread.

10 km south of Unayzah on the Riyadh road; on red sand dunes. 2,800 ft.



Euryops arabicus ◀

A rounded bushy shrublet 45 cm high with crowded narrow green leaves; yellow flowers 1 cm wide; sweet scent. Widespread in the southern mountains and seldom grazed.

Al Hadda, on the Jiddah-Taif road; near the lip of the escarpment, among rocks. 6,000 ft.



Felicia abyssinica ◆

A small narrow-leaved herb with flower stems 10 cm high; lilac flowers 1.5 cm wide; no scent. Widespread in the Asir and southern Hijaz.

A red granite mountain 15 km SW of Al Hadda, Jiddah-Taif road; in a sand pan among granite boulders. 7,000 ft.

Flaveria trinervia ◆

A many-branched leafy herb 35 cm high with dentate leaves; yellow flowers in heads 2 cm wide, clustered tightly in the angles of the stems; no scent.

Wadi Fatimah, near Jumum, off the Makkah road; at the edge of cultivated round. 500 ft.



Filago desertorum ◆

A semi-prostrate slender-stemmed herb with stems 10 cm long and pale grey soft-hairy leaves; edelweiss-like flowers in heads 8 mm wide; no scent.

10 km SW of Al Hadda, Jiddah-Taif road, on the road to the red mountain; among rocks near the roadside. 6,800 ft.



Felicia dentata ◆

An erect leafy herb 25 cm high; lilac flowers 1.5 cm wide; no scent. Widespread in the Asir and southern Hijaz.

A red granite mountain 15 km SW of Al Hadda, Jiddah-Taif road; among junipers on a steep rocky hillside, near the lip of the escarpment. 7,000 ft.



Gnaphalium luteo-album ◆

A semi-procumbent herb branching from the base with stems 35 cm long; silky-hairy bud-like flowers 3 mm wide, in clusters; no scent.

Najran; at the edge of an irrigated field in a date grove near town. 4,500 ft.



Hedypnois cretica ◆

A prostrate leafy herb with stems 10 cm long; yellow flowers 1.2 cm wide; the flower stem is thickened beneath the flowers. Fairly widespread in the southern mountains.

Wadi Mahra, 82 km south of Baljurshi, Taif-Abha road; on a grassy bank by the stream. 6,000 ft.



Gymnarrhena micrantha ◆

A dwarf very leafy herb with the leaves in rosettes; spiny bud-like flowers in spherical clusters 1.2 cm wide; no scent. Fairly widespread in the north.

Near Uqlat as Suqur, off the Madinah-Qassim road; in hard sand. 2,850 ft.



Helichrysum foetidum* var. *microcephalum ◆

A stout erect single-stemmed leafy herb 60 cm high; papery yellow flowers 6 mm wide, in clusters; slightly sour smell when crushed.

Near Tannumah, 8 km south of An Nimas; on the northern side of the valley, by the roadside. 6,600 ft.



Helichrysum forsskahlei ◆

An erect bushy shrublet 45 cm high with small narrow leaves; crowded yellow flowers 4 mm wide, in clusters 1.5 cm wide; aromatic.

Near the waterfall beauty-spot between Abha and Jabal Sawdah; among rocks near the stream. 8,500 ft.



Helichrysum glumaceum ◆

A slender-stemmed herb with stems to 35 cm long and a leafy base; small silvery flowers 3 mm wide, in crowded clusters 1 cm wide; no scent. Fairly widespread in scattered localities in the mountains.

Al Hadda, on the Jiddah-Taif road; among rocks near the lip of the escarpment. 6,000 ft.

◆ ***Hypochoeris glabra***

An erect herb to 10 cm tall with a basal rosette of slightly lobed leaves; bright yellow flowers 1 cm wide; no scent.

Between Jabal Ibrahim and Suq ar Rubu, off the Taif-Al Bahah road; among granite boulders, in sand. 6,800 ft.



Hochstettera schimperi ◆

An erect branching herb 60 cm high with small soft felted leaves; creamy-white flowers with prominent bluish stamens, in heads 1.5 cm wide and surrounded by spiny bracts; no scent.

Low rocky hills, 10 km east of Jiddah; among rocks in a small valley. 80 ft.





***Ifloga spicata* ◆**

An erect sparsely-branching herb 6 cm high with crowded narrow green leaves; tiny yellow bud-like flowers 1 mm wide, in the leaf axils. A widespread herb.

Near Uqlat as Suqur, off the Madinah-Qassim road; in hard sand. 2,850 ft.



***Iphiona* sp. 4138 ◆**

A very bushy shrublet 15 cm high with long narrow soft-spiny leaves; not wide-opening yellow flowers 5 mm wide; pleasantly aromatic foliage.

60 km north of Al Arid Camp (19° 10'N, 45° 06'E); in shallow gully on top of limestone scarp. 3,200 ft.



***Iphiona scabra* ◆**

A bushy herb 30 cm high with crowded spiny-tipped narrow leaves; not wide-opening yellow flowers 5 mm wide; very aromatic.

Jabal Tayran, overlooking the Gulf of Aqaba; among rocks near the summit. 2,200 ft.



***Iphiona mucronata* ◆**

A spiny bushy leafless shrublet 18 cm high; in bud and with fruiting heads 7 mm wide; non-aromatic.

North of Shiqri, on the Tabuk road; in crevices of red sandstone buttes. 3,100 ft.



◆ ***Kleinia odora***

A branching succulent-stemmed herb 1 m high, with small leaves present only for a short time on the new growth; creamy flowers 6 mm wide and 1.5 cm long including involucre, in clusters; sweet scent. Widespread in the Asir and southern Hijaz, usually above 3,000 ft.

A limestone outcrop between Abha and Najran, 45 km south of Zahran; in a crevice near the summit. 6,200 ft.

◆ ***Kleinia pendula***

A prostrate or pendent dark green succulent with stems 2.5 cm thick and several metres long, growing continuously from the apex and narrowed between each season's growth; small narrow leaves soon deciduous; bright red flowers 3 cm wide growing from the apex; sweet scent.

Jabal Fayfa, 100 km NE of Jizan; on steep rocky hillside, in light shade. 5,300 ft.



◆ ***Kleinia* sp.**

A leafy succulent with branching stems to 1 m long and having exceptionally large leaves 2.5 cm by 1.5 cm; creamy-white flowers 1 cm wide and 3 cm long, including involucre; sweet scent.

Jabal Fayfa, 100 km NE of Jizan; on steep well-vegetated hillside. 5,200 ft.



◆ ***Koelpinia linearis***

A slender branching herb 10 cm high with very narrow leaves; yellow flowers 7 mm wide; large, curved, separated claw-shaped fruits with short spines along the outer edge; a very distinctive plant in fruit. Widespread in scattered localities in the north.

In the headwaters of Wadi Qaraqir, 175 km south of Tabuk; on drifted sand among sandstone ravines. 2,000 ft.



Lactuca dissecta ➤

A slender erect herb 10 cm high with a basal rosette of large deeply dissected leaves; white flowers 6 mm wide; no scent. The flowers are sometimes pale blue.

Wadi Wejj near Taif; among large granite blocks and junipers on a steep rocky hillside. 6,000 ft.



***Lactuca inermis* (auct. *capensis*)** ➤

An erect herb with flower stem 40 cm tall and a leafy base of very narrow occasionally lobed leaves; pale blue flowers 1.8 cm wide with a darker centre. A variable plant.

Jabal Ibrahim, between Taif and Al Bahah; in crevice of huge granite boulder on lower slopes. 7,000 ft.



Lactuca* sp. aff. *sativa ➤

An erect sparsely branching leafy herb 1 m tall; reddish brown flowers 8mm wide; no scent. The narrow leaves have small spines along the mid-rib on the underside.

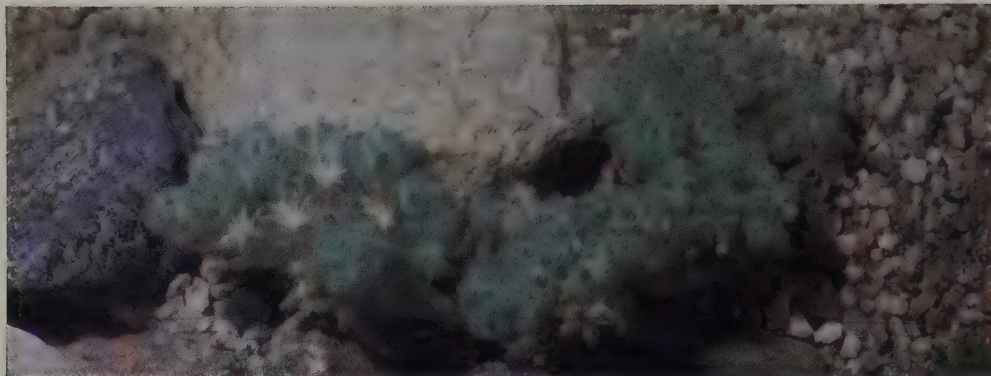
Najran; on a bank in a shaded lane leading to wheatfields. 4,500 ft.



Lactuca serriola ➤

An erect single-stemmed herb 1.75 m tall, branching near the crown, and having simple leaves with white dentate margin and mid-rib spiny on the underside; pale yellow flowers 8 mm wide; no scent; milky juice. Locally widespread. Summer flowering.

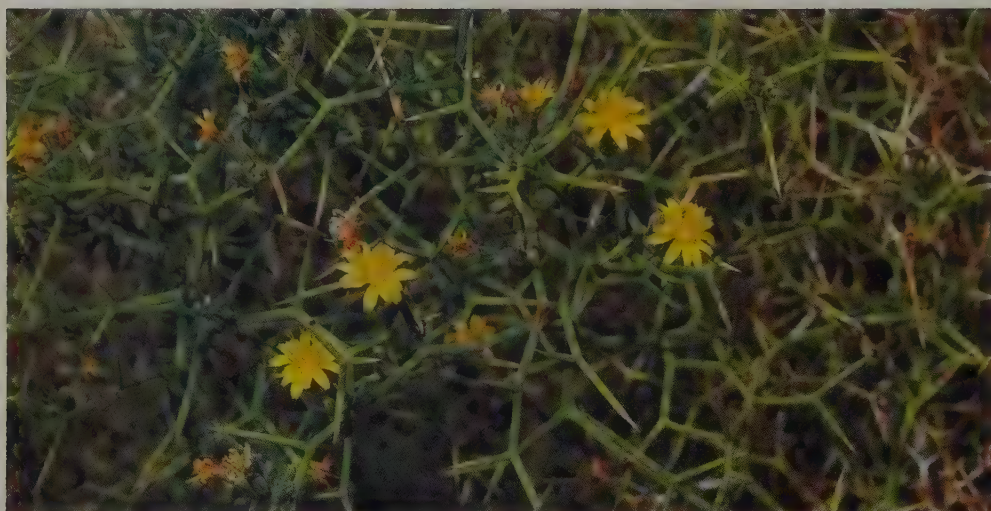
Near Baljurshi, Taif-Abha road; by the roadside. 6,800 ft.



◆ ***Lasiopogon muscoides***

A tiny prostrate herb with radiating stems to 1.5 cm long ending in a spherical head 1.5 cm wide of tiny yellowish flowers buried in woolly hairs. A new record for Saudi Arabia.

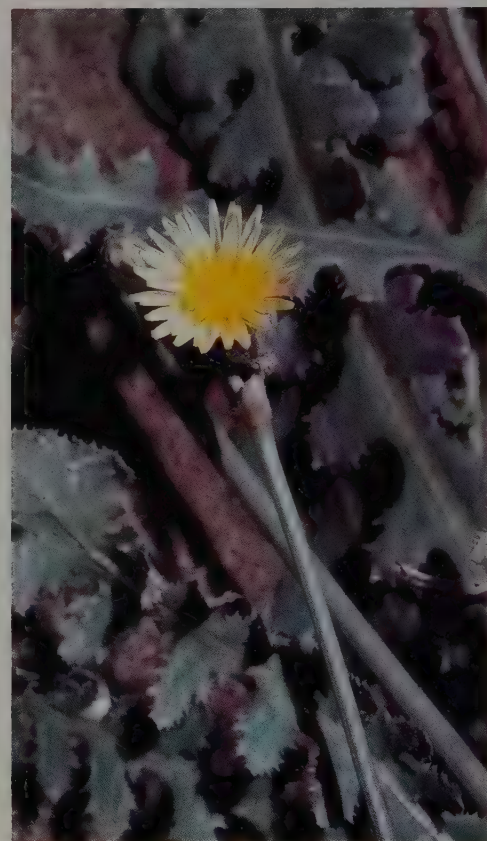
Near Aqiq, east of Al Bahah; in hard sand of wide wadi. 4,500 ft.



◆ ***Launaea acanthodes***

A many-branched spiny green-stemmed leafless shrublet 60 cm high; yellow flowers 1.5 cm wide; strong, unpleasant aroma; very milky sap.

Near Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; on a rocky hillside on the road to Shiqri. 2,800 ft.



◆ ***Launaea capitata*** ◆

A prostrate herb with stems 12 cm long radiating from a leafy rosette; pale yellow flowers 8 mm wide; no scent. An extremely widespread herb.

Low rocky hills, 10 km east of Jiddah; in hard sand. 80 ft.

◆ ***Launaea angustifolia***

A fairly stout branching leafy herb 25 cm high; yellow flowers 2.3 cm wide; no scent; the buds and old flower heads are nodding and the pappus on the seeds very cottony. Locally very abundant.

Jabal Tamiyah, a sandstone mountain SW of Uqlat as Suqur, off the Madinah-Qassim road; in crevices on the summit plateau. 4,450 ft.



Launaea cassiniana ◆

An erect branching herb to 45 cm tall with brittle stems and a basal rosette of very crisp, deeply dissected lobed leaves; yellow flowers 2 cm wide; no scent; milky juice. Fairly widespread in the north.

Near Zabirah, 200 km north of Buraydah; in hard sand in a wide shrub-filled wadi. 1,800 ft.



Launaea massauensis ◆

A very delicate-stemmed slender-branching herb 20 cm high; pale yellow flowers 8 mm wide; no scent. Fairly widespread in the southern mountains.

48 km south of Baljurshi, Taif-Abha road; on a steep rocky hillside. 6,500 ft.



Launaea intybacea ◆

An erect branching herb with a leafy base and stems to over 1 m long; the leaves having slender-spined margins; yellow flowers 1.1 cm wide; no scent.

At junction of the Makkah By-Pass with the Taif-Makkah road; in a wide sandy wadi. 1,000 ft.



Launaea mucronata ◆

An almost leafless many-branched blue-stemmed herb 10 cm high; yellow flowers 1 cm wide; no scent.

5 km SW of Al Hadda, Jiddah-Taif road, on the road to the red mountain; in gravelly sand by the roadside. 6,500 ft.



Leysera leyseroides ◆

An erect very slender-stemmed branching herb 12 cm high with small narrow leaves; not wide-opening yellow flowers 3 mm wide; no scent. Fairly widespread in the north.

Jabal Tamiyah, an isolated mountain SW of Uqlat as Suqur, off the Madinah-Qassim road; in a crevice on the flat sandstone summit. 4,450 ft.

◆ ***Launaea nudicaulis***

A branching naked-stemmed herb with a basal rosette of dentate white-margined leaves, and stems to 30 cm long; yellow flowers 2 cm wide; sweet scent. Locally fairly widespread.

97 km north of Buraydah; in drifted sand on a sandstone outcrop. 2,800 ft.

Launaea procumbens ◆

An erect branching herb with a basal rosette of lobed pale-toothed leaves; leafless stems to 40 cm tall; pale yellow flowers 8 mm wide, in clusters; milky juice.

Dumsuk Island, Farasan group; in hard sand of small abandoned field. Locally common, especially on Farasan Island. 50 ft.



Leontodon laciniatus ◆

A prostrate herb with a basal rosette of deeply lobed leaves and naked stems to 15 cm long; yellow flowers 2 cm wide; no scent.

Near Zabirah, 200 km north of Buraydah; in hard sand, among bushes in a wide wadi. 1,800 ft.

Onopordon heteracanthum ◆

An erect branching spiny-leaved herb 1 m high with white-downy leaves and spiny winged stems; purple-magenta flowers 4 cm wide; sweet scent; the long spines on the involucre are purplish. Fairly widespread locally.

Near Baljurshi, on the Taif-Abha road; in gravel by the roadside. 6,500 ft.





Onopordon sibthorpiatum ◆

A dead branching herb 1.25 m tall with winged stems and large rugose spiny leaves; pale purple (dead) flowers 3 cm wide; the curved spines of the involucre enlarge in fruit.

65 km due east of Turayf Camp (31° 40' N, 39° 29' E); in a claypan on a limestone plateau. 2,900 ft.



Pegolettia senegalensis ◆

An erect leafy herb 23 cm tall with single stem and branching flower stalks; not wide-opening yellow flowers 5 mm wide; non-aromatic.

166 km SE of Jiddah on helicopter flight-path to Al Bahah; in a small valley. 3,600 ft.



Osteospermum vaillantii ◆

An erect bushy slender-stemmed herb 45 cm high; yellow flowers 1.5 cm wide; no scent; the fruiting heads of winged seeds are nodding. Very widespread in the Asir and southern Hijaz.

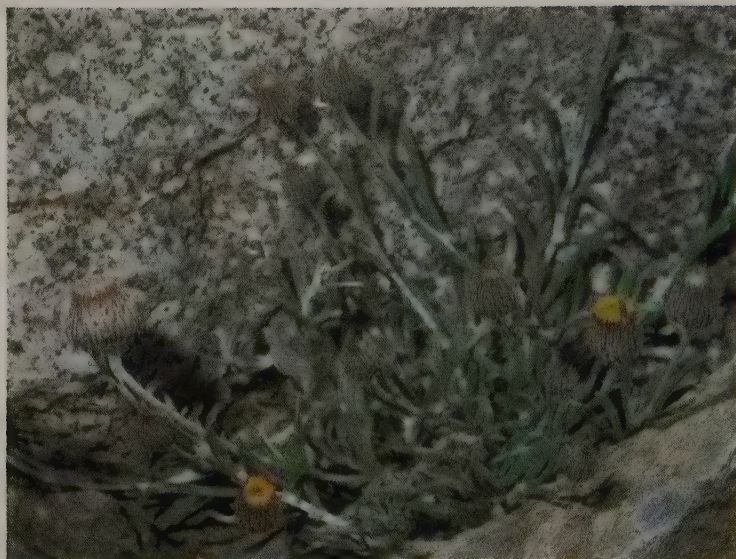
5 km SW of Al Hadda, Jiddah-Taif road, on the road to the red mountain; on a rocky hillside. 6,500 ft.



Phagnalon barbeyanum ◆

A bushy herb 30 cm tall with white stems and erect narrow leaves having rolled edges; not wide-opening yellow flowers 5 mm wide and 1 cm long; no scent.

180 km SSW of Turayf Camp (31° 40' N, 39° 29' E); in a ravine in basalt, among rocks. 2,300 ft.



Phagnalon rupestre ▲

An erect woody-based herb 20 cm tall with white woolly stems branching mainly from the base and narrow leaves; not wide-opening brownish flowers 7 mm wide; no scent.

Jabal Dabbagh, a 7,500 ft. granite massif 88 km SW of Tabuk; on a stony hillside. 5,500 ft.



Phagnalon scalarum ▲

A bushy shrublet 20 cm tall having dentate leaves with silvery underside; not wide-opening yellow flowers 6 mm wide; no scent.

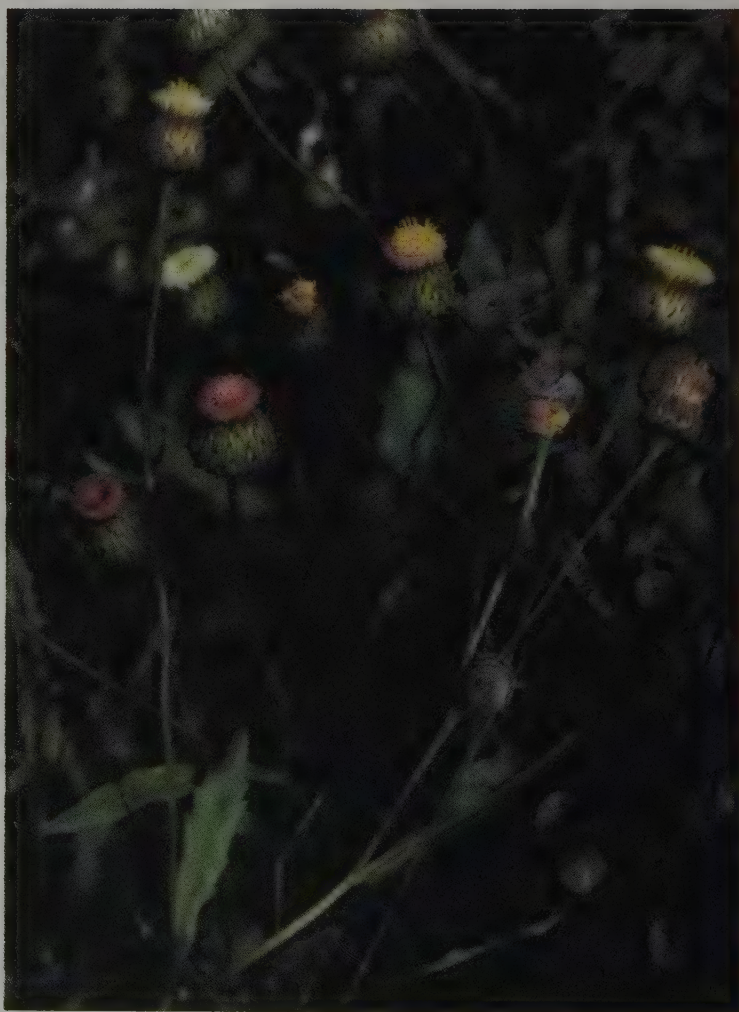
Jabal Fayfa, 100 km NE of Jizan; in earthy bank of steep road cutting. 5,000 ft.



Phagnalon* cf. *saxatile ▲

An erect bushy herb with white stems to 20 cm long and with narrow greyish leaves; not wide-opening brownish flowers 7 mm wide, cupped in a very dark brown calyx; non-aromatic.

Jabal Radwa, a 7,500 ft. granite massif 70 km north of Yanbu; in a rock crevice in a ravine. 6,200 ft.



Phagnalon* sp. aff. *scalarum ▲

A tangled bushy leafy herb 45 cm high with slender stems; not wide-opening pinkish flowers 6 mm wide; non-aromatic. Fairly widespread locally.

Near Baljurshi, on the Taif-Abha road; in the stone retaining-wall of a fallow field. 6,500 ft.



◆ *Phagnalon sinaicum*

A leafy shrublet 12 cm tall with stout woody base, brown stems and erect narrow bright green leaves; not wide-opening yellow flowers 3 mm wide; non-aromatic. Fairly widespread locally.

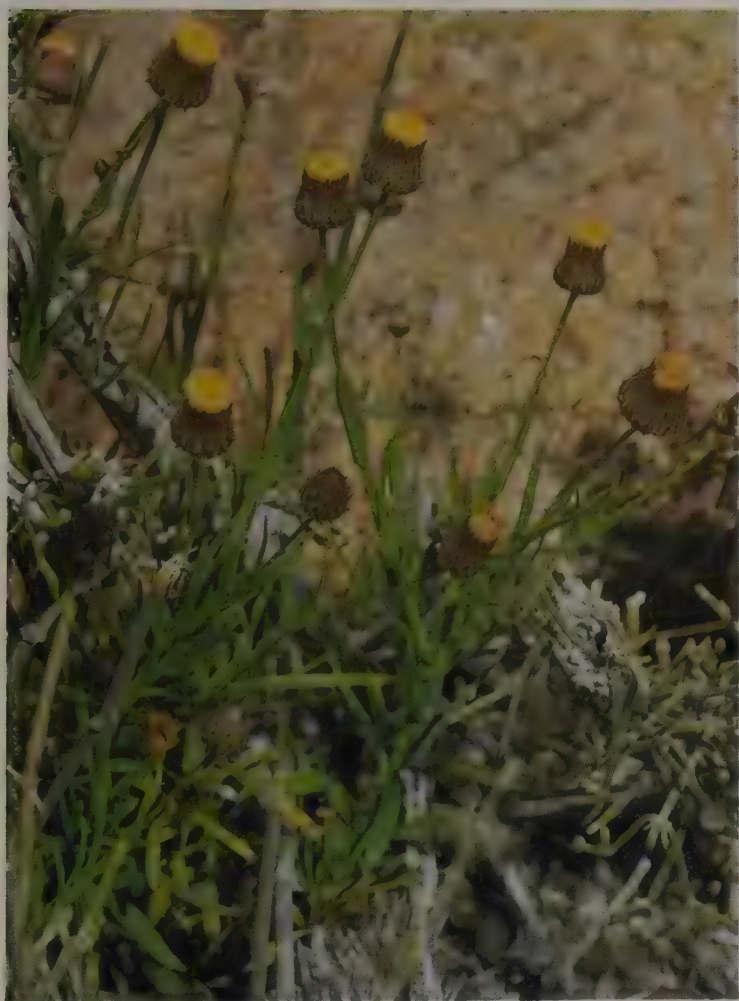
Harrat Khaybar Camp (25° 41'N, 39° 57'E), near airstrip; among lava blocks near summit of volcano. 5,900 ft.



◆ *Phagnalon* sp. 1801 ◆

A white-stemmed bushy leafy shrublet 25 cm tall; in bud and with young fruiting heads 6 mm wide; non-aromatic.

Aban al Ahmar, a granite massif 143 km SW of Buraydah; in a rock crevice on the summit. 4,200 ft.



◆ *Phagnalon* sp. 4383

A tufted woody-based herb with bright green stems to 17 cm long and long narrow leaves; not wide-opening yellow flowers 6 mm wide; aromatic.

Jabal Dabbagh, a 7,500 ft. granite massif 88 km SW of Tabuk; in granite crevice on NW side. 5,500 ft.



◆ *Picris abyssinica* ◆

A white-hairy herb with a basal rosette of lobed leaves and flower stems 12 cm long; yellow flowers 4.5 cm wide with dentate tipped ray florets and a black centre.

Dawadimi Camp (24° 33'N, 44° 13'E); in hard sand near granite outcrop. 2,700 ft.



***Picris* sp. 933** ▲

An erect branching herb 30 cm high with entire arrow-shaped stem leaves; dark yellow flowers 2 cm wide; no scent.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; among rocks on a steep hillside. 3,000 ft.

***Picris* sp. 1816** ▼

A single-stemmed herb with a rosette of basal leaves and flower stem 8 cm long; yellow flowers 2 cm wide with blackish centre; no scent. Widespread in the north.

Aban al Ahmar, a granite massif 143 km SW of Buraydah; in a small date grove in a hanging valley. 3,800 ft.



***Picris* sp. 4271** ◆

An erect hairy herb with stems 13 cm long; yellow flowers 2.5 cm wide; no scent.

40 km WNW of Turayf Camp (31° 40'N, 39° 29'E); in limestone detritus. 2,900 ft.



***Picris* sp. 3240** ▲

An erect herb with a basal rosette of lobed hairy leaves and flower stems 20 cm long; yellow flowers 2 cm wide with a black centre; no scent. Widespread.

The Taif end of the Makkah By-Pass; in a rocky wadi. 1,000 ft.





Pluchea dioscoridis ♣

An erect very bushy leafy shrublet 1.5 m high; not wide-opening narrow lilac flowers 5 mm wide; aromatic. Very widespread along streams, especially in the southern mountains and seldom grazed.

Tannumah, a watered valley 12 km south of An Nimas, Taif-Abha road; on the river bank. 6,500 ft.



Pulicaria arabica ♣

An erect bushy short-hairy shrublet 60 cm high with small greyish leaves; yellow 'button' flowers 8 mm wide; aromatic.

Najran, near the New Dam; in rocks by the river bank. 4,500 ft.



***Psiadia punctulata* (auct. arabica)** ♣

A bushy leafy shrublet to nearly 1 m high; bright yellow flowers 5 mm wide, in crowded clusters; the flowers are sweet-scented, but the slightly sticky foliage is unpleasantly aromatic; seldom grazed. Very widespread in the southern mountains mostly north of Abha and near the escarpment.

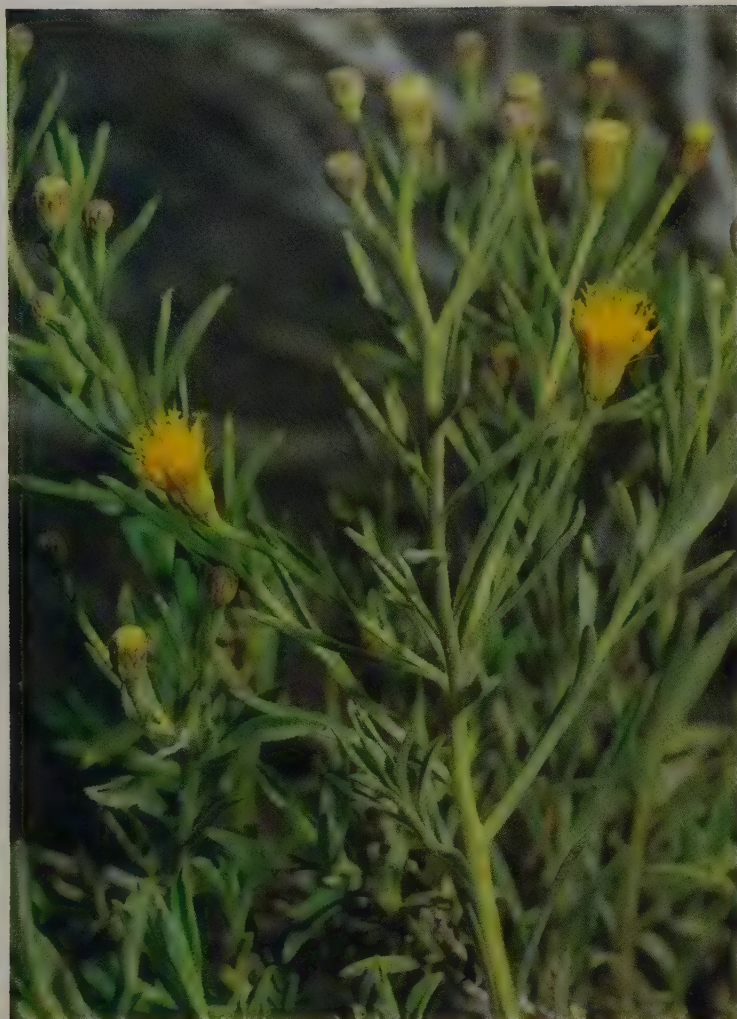
Near the top of the escarpment, Jiddah-Taif road; on a steep rocky hillside. 5,000 ft.



Pulicaria crispa ♣

A very bushy shrublet 30 cm high with small crinkled green leaves; yellow 'button' flowers 8 mm wide with short ray florets; aromatic. An extremely widespread plant throughout the region and somewhat variable; the leaves and stems are sometimes grey and not aromatic.

Uqlat as Suqur, on the Madinah-Qassim road; in a sand-pan near the village. 2,800 ft.



◆ ***Pulicaria glutinosa***

An erect bushy shrublet nearly 1 m high with narrow leaves; not wide-opening yellow flowers 5 mm wide; pleasantly aromatic foliage.

Jabal Manfah, 50 km NNW of Najran, Abha road; on a ledge near the summit of a sandstone butte. 6,200 ft.



◆ ***Pulicaria incisa***

A very bushy white-downy shrublet with crinkled leaves; dark yellow flowers 1.2 cm wide with medium-sized ray-florets; very aromatic. Widespread in the north.

Jabal Tamiyah, an isolated mountain SW of Uqlat as Suqur off the Madinah-Qassim road; in a rocky ravine on the lower slopes. 3,100 ft.



◆ ***Pulicaria guestii***

A bushy leafy herb 20 cm high with very aromatic foliage; yellow flowers 1 cm wide with short ray-florets; no scent.

Aqiq Airport, inside the perimeter fence; in hard sand. 4,800 ft.



◆ ***Pulicaria inuloides***

A branching herb with slender stems to 30 cm long; large yellow flowers 4.5 cm wide; no scent. Only three very large-flowered plants found.

Halfway up the escarpment, Jiddah-Taif road; among rocks. 4,500 ft.

Pulicaria jaubertii ◆

A leafy branching slightly hairy herb 40 cm high; bright yellow flowers 2.2 cm wide; aromatic. Locally abundant.

Najran; in a field in the town centre. 4,500 ft.

***Pulicaria petiolaris*** ◆

A bushy leafy herb with slender stems to 30 cm long and slightly dentate leaves; yellow flowers 1 cm wide; no scent. Widespread in the southern mountains and somewhat variable.

Halfway up the escarpment, Jiddah-Taif road; in a steep rocky ravine. 4,500 ft.

***Pulicaria somalensis* ssp. *somalensis*** ◆

An erect slender-stemmed many-branched shrubby herb 1 m tall; yellow flowers 1 cm wide; aromatic. Locally abundant.

Halfway down the escarpment, Abha-Jizan road; on a steep rocky hillside. 4,500 ft.

***Pulicaria schimperi*** ◆

A small erect very white-woolly herb 5 cm high; yellow flowers 2 cm wide; non-aromatic. Locally widespread. Very variable in flower size and degree of hairiness.

Jabal Manfah, 50 km NNW of Najran, Abha road; among rocks on a sandstone butte. 6,200 ft.





Pulicaria vulgaris ◆

A branching slightly hairy herb 30 cm high; yellow 'button' flowers 1 cm wide; non-aromatic.

Wadi Habaqah, 32 km south of Baljurshi, Taif-Abha road; in damp sand by the stream. 6,000 ft.



Reichardia tingitana* var. *arabica ◆

An erect branching leafy-based herb with stems 60 cm long; yellow flowers 2 cm wide; no scent; the stem is swollen below the involucre. In scattered localities in the Asir and southern Hijaz.

One third of the way up the escarpment, Jiddah-Taif road; among rocks in a small wooded valley. 3,500 ft.



Reichardia tingitana ◆

A small herb with a leafy rosette, the young leaves white-granular; flower stem 3 cm high; yellow flowers 2 cm wide with deeper coloured centre; no scent; fat buds with large bracts. Widespread, especially in the north, and somewhat variable.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; on a low rocky hillside. 2,000 ft.



Rhagadiolus stellatus ◆

A branching herb 60 cm tall with a few large leaves having slightly dentate spiny margins; yellow flowers 5 mm wide; star-like fruiting heads.

Jabal Ibrahim, NW of Al Bahah off the Taif-Abha road; among granite rocks near the summit. 8,000 ft.



Rhanterium eppaposum ◆

A very bushy branching shrublet 35 cm high with tiny narrow leaves; yellow flowers 1.5 cm wide; no scent; soft-spiny involucre. A very widespread plant in the north.

Near Hanakiyah, on the Madinah-Qassim road; in hard red sand near a large sandstone outcrop. 2,300 ft.



Scariola orientalis ◆

A grazed spiny woody shrublet 10 cm tall with white stems partially covered by green sheaths (decurrent auricles) and with lobed basal leaves; pale yellow flowers 1 cm wide with four ray florets; aromatic. This plant is similar to *Launaea acanthodes*, and both have a milky juice but the *Launaea* has bright green stems with no auricles.

Harrat Khaybar Camp (25° 41' N, 39° 57' E); in hard sand at edge of lava flow. 5,700 ft.



Scorzonera intricata ◆

An erect slender-stemmed slightly branching grey-green herb 50 cm high with a few narrow leaves having rolled edges; yellow flowers 1.5 cm wide, always with only five dentate-tipped rays; no scent. In scattered localities in the north.

Near Zabirah, 200 km north of Buraydah; among red sand dunes. 1,800 ft.



Scorzonera papposa ◆

A leafy herb, the large arrow-shaped slightly dentate leaves usually forming a rosette; flower stem to 18 cm long; pink flowers 3 cm wide; sweet scent; the large white fleshy black-skinned root is edible.

50 km north of Qiba and 150 km north of Buraydah; on the edge of the limestone plateau. 1,800 ft.



Scorzonera rawii ♣

A leafy herb, the long wavy-edged leaves forming a rosette and the flower stem 10 cm long; yellow flowers 2.5 cm wide; faint scent; the white fleshy brown-skinned root is edible. Locally widespread.

Jabal Dabbagh, a 7,500 ft. granite massif 88 km SW of Tabuk; in crevices on a steep rocky hillside. 5,500 ft.



Scorzonera schweinfurthia ♣

A white-downy leafy-based herb with stems to 15 cm long and having the margins of the narrow leaves crimped; yellow flowers 3 cm wide; no scent; fleshy brown-skinned root.

Near Turayf Camp (31° 40'N, 39° 29'E); in limestone detritus and sand. 2,900 ft.



Scorzonera tortuosissima ♣

A branching-stemmed semi-prostrate herb with stems to 75 cm long and with terete leaves; yellow flowers 2.2 cm wide, with many dentate-tipped rays; no scent. Fairly widespread.

Near Nabhaniyah, 100 km SW of Buraydah; in hard sand in a fallow field. 2,300 ft.



Senecio asirensis ♣

A bushy shrublet 1 m high with grey-green leaves; yellow flowers 2.5 cm wide; no scent.

100 km south of Baljurshi, Taif-Abha road; on a rocky hillside near cultivation. 6,500 ft.



Senecio deltoideus ◆

A leafy herb 20 cm tall with almost hastate crenulate-margined leaves and crenulate stipules; yellow flowers 1 cm wide; no scent.

Jabal Fayfa, 100 km NE of Jizan; in earthy bank of steep road cutting. 5,000 ft.



Senecio glaucus ◆

A leafy herb 10 cm high with slender deeply lobed leaves; yellow flowers 1.5 cm wide; no scent. Fairly widespread in the north.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; among rocks near the summit of a steep hill. 3,000 ft.



Senecio flavus ◆

An erect slightly-branching leafy herb 30 cm high with almost round dentate leaves, purple underneath, clasping the stem; yellow flowers 4 mm wide; no scent. Fairly widespread.

Wadi Kharar, near the foot of the escarpment, Taif-Jiddah road; among granite boulders in a steep ravine. 1,500 ft.



Senecio hadiensis ◆

A tangled-stemmed shrub 1 m high and 2 m wide with very large glabrous leaves; yellow flowers 1 cm wide, in flat heads; no scent.

Jabal Fayfa, 100 km NE of Jizan; on a steep rocky hillside. 5,400 ft.



Senecio hoggariensis ▲

A slender erect herb 22 cm high with lobed leaves; small flowers 8 mm wide with lilac ray florets; no scent.

One third of the way up the escarpment, Jiddah-Taif road; among granite boulders on a rocky hillside. 3,500 ft.



Senecio schimperi ▲

A very bushy leafy herb 45 cm high; not wide-opening yellow 'button' flowers 5 mm wide; no scent.

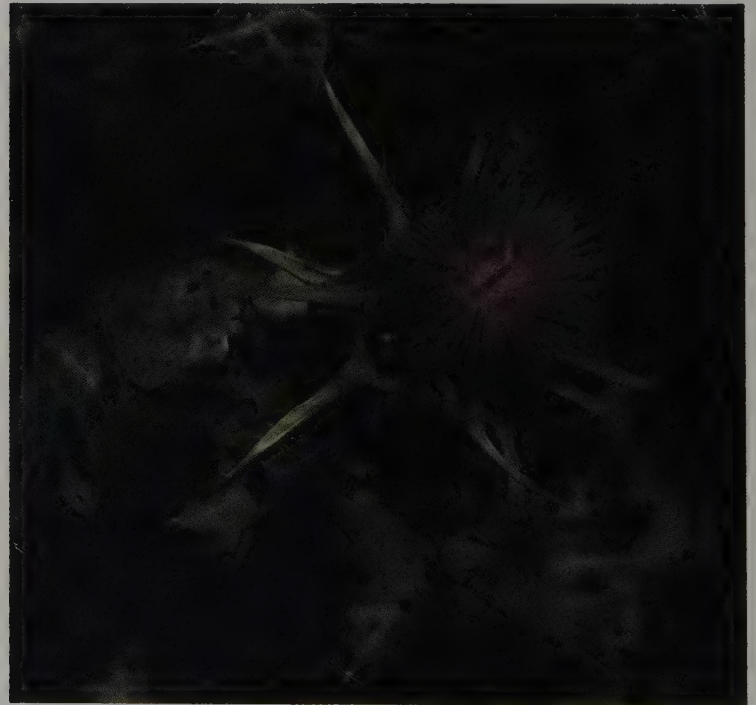
On the Abha-Jabal Sawdah-Taif Ring Road; on the bank of a small stream. 8,500 ft.



Senecio sumarae ▲

An erect sparsely branching leafy herb 40 cm tall; yellow flowers 2.5 cm wide; no scent.

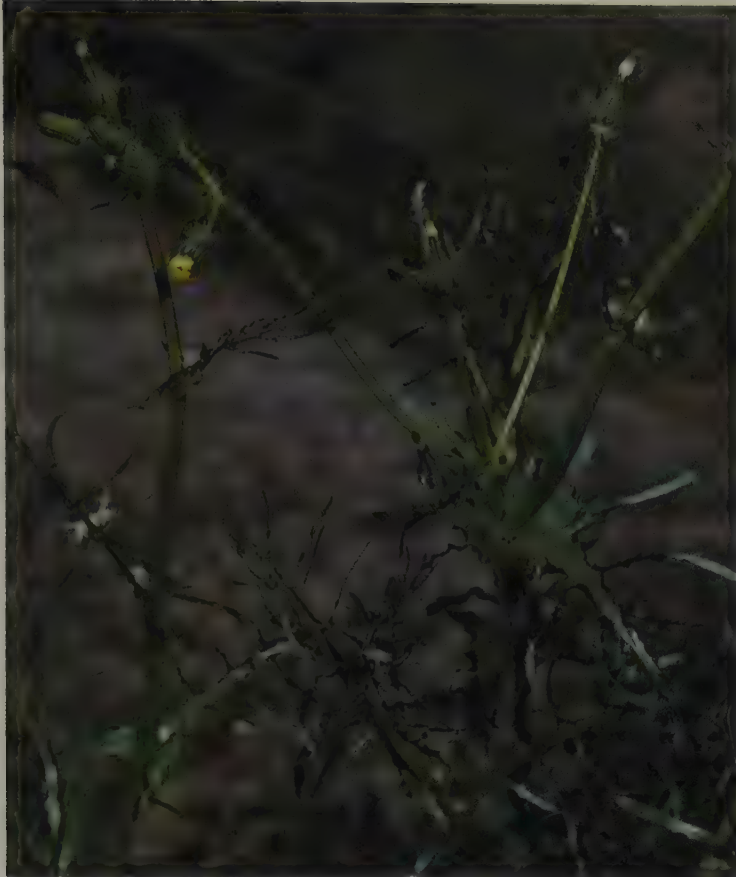
Jabal Sawdah, 28 km NW of Abha; in the damp sand of a small ravine at the lip of the escarpment. 9,000 ft.



Sillybum marianum ▲

An erect branching prickly-leaved herb 1.5 m high, the wide glabrous leaves having silvery mottling along the veins; purple flowers 2.5 cm wide; very spiny involucre. A white-flowered form is abundant around Al Bahah.

Near Baljurshi, on the Taif-Abha road; by the roadside, near cultivation. 6,500 ft.



Sonchus asper ◆

An erect very leafy herb 1.25 m tall with hairy stems and with deeply lobed finely dissected leaves having dentate margins, the base encircling the stem; yellow flowers 1.5 cm wide; sweet scent; very milky juice. The base of the calyx sometimes white-woolly. Summer flowering.

15 km from As Shafa on the Taif road; in damp sand among granite boulders. 6,000 ft.



Sonchus tenerrimus ◆

An erect juicy leafy herb with glabrous stems 30 cm long and very dissected often hastate leaves clasping the stem; yellow flowers 1.2 cm wide; no scent; milky juice.

One third of the way up the escarpment, Jiddah-Taif road; in a sand-pan below granite slope. 3,500 ft.



Sonchus oleraceus ◆

A grazed herb, the leaves forming a basal rosette, and flower stem 25 cm tall; pale yellow flowers 1.5 cm wide; no scent.

Najran; in a fallow field in the town centre. 4,500 ft.



Tagetes minuta ◆

A straggly herb with ascending stems to 35 cm long; pale yellow flowers 5 mm wide and 1 cm long; aromatic. Summer flowering.

The waterfall beauty-spot between Abha and Jabal Sawdah; in damp sand among sedges by the stream. 8,500 ft.



Tanacetum sinaicum ◆

A bushy leafy shrublet with naked branching flower stems to 65 cm long and very dissected pale greyish white leaves; bud-like yellow flowers 7 mm wide; very aromatic.

Jabal Warjan, a 6,700 ft granite massif 60 km SW of Madinah; in narrow ravine among rocks. 5,500 ft.



Tarchonanthus camphoratus ◆

A slender arching-stemmed shrubby tree 5 m high with silvery-green leaves; soft-spiny pale yellow flowers in heads 1 cm wide, in spikes; sweet scent. In scattered localities in the Asir and southern Hijaz.

Jabal Abu Hassan, a sandstone-topped massif off the edge of the escarpment between Abha and Najran; on the summit plateau. 5,500 ft.



***Tanacetum* sp. 4274** ◆

An erect branching herb with stems to 20 cm long and with bright green very finely dissected leaves; white flowers 2.5 cm wide; non-aromatic.

25 km NW of Turayf Camp (31° 40'N, 39° 29'E); in silt-pan on limestone plateau. 2,900 ft.



Tragopogon dubius ◆

An erect branching stemmy herb 1 m high with long grass-like leaves; yellow flowers 6 cm wide; spherical fruiting heads 11 cm in diameter.

Near Al Bahah, on the Taif-Jiddah road; on a bank on the fringe of the village. 7,000 ft.



Urospermum picroides ◆

An erect leafy herb with hairy stems 22 cm tall; yellow flowers 2 cm wide; no scent; coarse-hairy buds and calyx. Fairly widespread in the southern mountains.

One third of the way up the escarpment, Jiddah-Taif road; on a rocky hillside. 3,500 ft.



Varthemia iphionoides ◆

A bushy woody-based herb, the young stems and foliage downy and intensely aromatic; not wide-opening deep yellow flowers 1 cm long and 4 mm wide. Locally widespread.

North of Shiqri, on the Tabuk road; in crevices of red sandstone buttes. 3,100 ft.



Verbesina encelioides ◆

An erect branching leafy herb 1 m high; many-rayed yellow flowers 5 cm wide; sour smell. Very widespread around Abha; an introduced weed from America.

Near Zahran, on the Abha-Najran road; in gravelly sand near the town. 6,200 ft.



Vernonia abyssinica ▲

An erect bushy leafy shrublet nearly 2 m high; pale lilac flowers 2 cm wide; sweet scent. In scattered localities in the southern mountains.

Near the top of the escarpment, Jiddah-Taif road; in hard sand by a cutting on the roadside. 4,000 ft.



Vernonia cinerea ◆

An erect leafy herb 45 cm high; not wide-opening deep purplish flowers 2mm wide; no scent. In scattered localities in the south.

Ad Aridah, near the Yemen border, east of Jizan; on the edge of a grove of *Pandanus*, in sand. 800 ft.

Volutaria albicaulis ◆

An erect branching stemmy herb with grey-green downy foliage; pink flowers 2.2 cm wide with a darker centre; no scent. Locally widespread in the southern Asir.

Near Jabal Manfah, 50 km NNW of Najran, Abha road; on the summit of a sandstone butte. 7,100 ft.



Vernonia cinerascens ▲

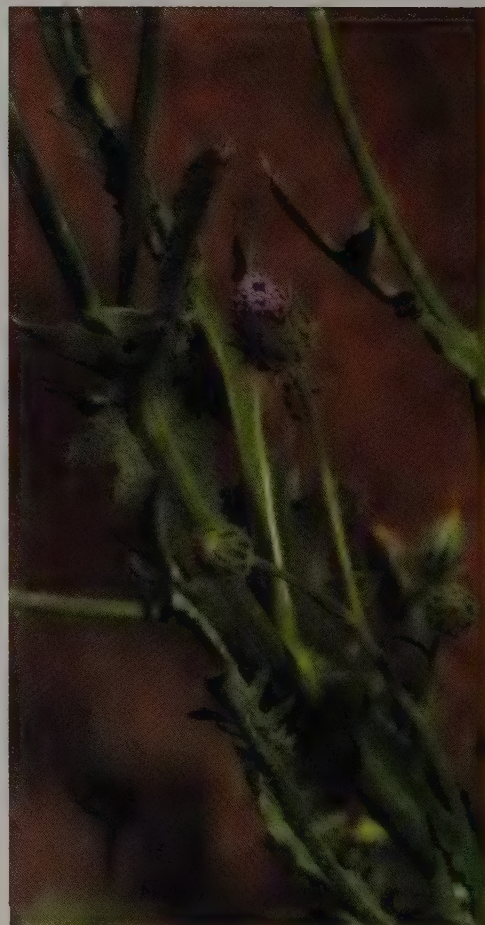
A grazed shrublet 45 cm high with small silvery leaves; not wide-opening deep rosy-purple flowers 6 mm wide; no scent. In scattered localities in the south.

Jabal Manfah, 50 km NNW of Najran, Abha road; among rocks on a sandstone butte. 6,200 ft.

Volutaria lippii ◆

An erect branching stemmy herb 40 cm high; the base of the lobed leaves extending down the stem; not wide-opening pale purple flowers 7 mm wide; no scent.

25 km north of Qiba, and 180 km north of Buraydah; in a shallow sandy wadi near the limestone escarpment. 1,500 ft.





Xanthium cf. pungens ◆

A bushy leafy herb 1 m tall with purplish stems and large-lobed dentate leaves; shiny oval fruits 2 cm long with coarse hooked bristles. Summer flowering.

Mahalla reservoir, near Abha; in damp sand among dense vegetation. 6,000 ft.



Xanthium strumarium ◆

A stout-stemmed branching herb 50 cm tall with downy palmate leaves; greenish male florets in round heads 5 mm wide; female florets enclosed within oval bodies 1.3 cm long and 7 mm wide, with hooked bristles. Summer flowering.

Tannumah, 12 km south of An Nimas, Taif-Abha road; in granite sand near the stream. 6,500 ft.



Xanthium spinosum ◆

A bushy very spiny woody herb 30 cm tall with narrow simple leaves; female flowers enclosed within oval bodies 1 cm long and 5 mm wide, with hooked bristles. Locally widespread. Summer flowering.

Abha; on waste ground. 6,500 ft.



Zoegea purpurea ◆

An erect stemmy branching herb 38 cm high with entire leaves; bud-like flowers 8 mm wide, the involucre having soft-spiny bracts tipped with crimson. In scattered localities in the north.

25 km north of Qiba and 180 km north of Buraydah; in a shallow sandy wadi near the limestone escarpment. 1,500 ft.

CONVOLVULACEAE

Many members of this family are herbs or vines, but *Astripomoea malvacea* and two *Convolvulus*, *C. lanatus* and *C. oxphyllus* are shrubs; *C. hystrix* and all the species of *Seddera* are woody-stemmed. Three genera are not easily recognizable to the layman as members of this family, *Cressa*, *Cuscuta* and

Dichondra, and some authorities place the latter two in their own families, Cuscutaceae and Dichondraceae.

All the species have their main flowering period in the spring except for *Convolvulus lanatus*, which flowers in late summer. Only *Cressa* is scented.



Convolvulus arvensis ◆

A spreading prostrate leafy herb with stems to 1 m long; white flowers, flushed with pink, 2.5 cm wide. A widespread plant, usually a weed of cultivation.

Wadi Khulays, 75 km NNE of Jiddah; at the edge of cultivation. 200 ft.

◆ ***Astripomoea malvacea***

A very leafy semi-prostrate shrub 2 m wide with tangled branches and downy leaves; lilac flowers 5 cm wide with purple centre.

Jabal Fayfa, 100 km NE of Jizan; near summit, on stony hillside near road. 5,400 ft.



◆ *Convolvulus cephalopodus*

An erect bushy leafy white-hairy herb 40 cm tall with narrow grey-green leaves having sunken veins; white flowers 2.5 cm wide;

Al Arid Camp (19° 10'N, 45° 06'E); in hard sand between road and limestone scarp. 2,700 ft.



◆ *Convolvulus fatmensis*

A spreading prostrate herb with stems 70 cm long and lobed leaves, wavy-edged and sunken-veined; small pale pink flowers 9 mm wide.

Near the sewage works 10 km south of Jiddah; in a silt-pan. 10 ft.



◆ *Convolvulus deserti*

A sparsely spreading herb with stems to 1 m long; white flowers 1.2 cm wide streaked with pink behind. Widespread near the coast.

Between the new Jiddah Airport and Madinah Road, Jiddah; a shallow sandy ditch. 20 ft.



◆ *Convolvulus glomeratus*

A trailing or twining herb with stems to 2 m long; small white flowers 1 cm wide; hairy calyx. A fairly widespread plant, especially in the south.

Low rocky hills, 10 km east of Jiddah; in hard sand among small bushes. 80 ft.



Convolvulus hystrix ◆

A dense many-branched prickly shrublet 50 cm high and 1 m wide; pale bluish lilac flowers 1.2 cm wide. Widespread in the coastal region around Jiddah.

Between the new Jiddah Airport and Madinah Road, Jiddah; in a shallow sandy ditch. 20 ft.



Convolvulus oxyphyllus ◆

A dense prickly grey-green shrub 50 cm high; white flowers 1.4 cm wide. Spring flowering.

Near Nabhaniyah, 100 km SW of Buraydah; in a fallow field. 2,300 ft.



◆ ***Convolvulus lanatus***

An erect many-branched downy-leaved shrub 35 cm tall with pale stems; white flowers 1.2 cm wide. Autumn flowering. Fairly widespread on sandy plains in the north, and often heavily grazed.

Near Zabirah, 200 km north of Buraydah; on the edge of red sand dunes. 1,800 ft.



Convolvulus pilosellifolius ◆

A prostrate branching leafy herb with stems to 1 m long; pale pink flowers 2 cm wide; no hairs at the nodes.

21 km north of Qiba and 180 km north of Buraydah; in a clay-pan. 1,500 ft.



Convolvulus prostratus ◆

A grazed densely twiggy shrublet 25 cm tall with narrow downy leaves; pale pink flowers 1.8 cm wide; also occurs as a prostrate or scrambling herb.

Edge of Rub' al Khali, 60 km NNE of Al Arid Camp (19° 10'N, 45° 06'E); in sand of shallow wadi on limestone scarp. 3,000 ft.



Convolvulus rhyniospermus ◆

A tiny leafy herb 2 cm high with long white hairs in the young leaf axils; pale pink deeply lobed flowers 4 mm wide. The plant is sometimes prostrate with long stems and quite large leaves.

Near Jabal Mershid, 25 km east of Qunfudhah; on a sandy plain. 50 ft.



Convolvulus siculus ◆

A leafy slightly hairy herb with stems 8 cm long; bright blue flowers 1 cm wide, dying by noon; pendent glabrous fruits.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; in valley on southern side, in damp sand near pools. 2,800 ft.

Convolvulus spicatus ◆

A branching soft-downy herb with ascending stems to 35 cm long; hairy buds; large pale flowers 3 cm wide.

Near Zabirah, 200 km north of Buraydah; on drifted red sand. 1,800 ft.





***Convolvulus* sp. nov. ♣**

A grazed 'cushion' herb with silvery downy stems and leaves; pure white flowers 2.8 cm wide. Fairly widespread between Abha and Najran.

Jabal Manfah, 50 km NNW of Najran, Abha road; in hard sand. 6,200 ft.



***Cressa cretica* ♣**

A bushy leafy herb 6 cm high with tiny grey-green leaves; flowers 3 mm wide with prominent white stamens; sweet scent. Widespread on salt flats near the sea.

Between new Jiddah Airport and Madinah road, Jiddah; in a shallow sandy ditch. 20 ft.



***Cuscuta campestris* ♣**

A bright orange succulent-stemmed parasite with tangled branching stems covering 1 m or more; white flowers 3 mm wide, on distinct stalks, in rounded heads; spherical fruits 3 mm wide; An American weed imported on alfalfa seed but becoming naturalised.

Dirab Farm, 30 km west of Riyadh; a parasite on *Convolvulus arvensis*. 1,800 ft.



***Cuscuta hyalina* ♣**

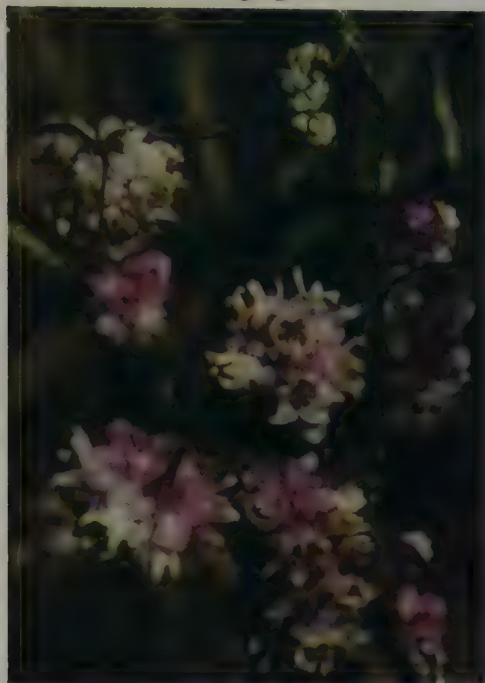
A leafless parasite with tangled bright yellow stems covering more than 1 m; creamy flowers 5 mm long, on short stalks in groups of three or four.

Near the foot of Jabal Sharda, off the Jiddah-Jizan road; on mixed herbs and grasses in the shade of an acacia. 700 ft.

Dichondra repens ♦

A creeping mat-forming herb with round leaves; white flowers 5 mm wide encircled by larger green sepals.

Jabal Sawdah, 28 km NW of Abha; in shade under overhanging rocks. 9,000 ft.

***Cuscuta planiflora*** ♦

A thin-stemmed tangled leafless parasite white flowers 3 mm wide, in a spherical head 8 mm in diameter. The flowers are sometimes pink. Very widespread on a variety of plants, usually small herbs.

One third of the way up the escarpment, Jiddah-Taif road; parasitic on *Justicia flava*, on a rocky hillside. 3,500 ft.

Evolvulus alsinoides ♦

A leafy semi-prostrate herb with slender stems to 25 cm long; bright blue flowers 7 mm wide.

Between Mudhaylif and Muhayl; at the edge of a large shallow pond. 1,300 ft.

***Falkia oblonga*** ♦

A prostrate mat-forming branching woody herb covering 1 m or more, the stems half buried in sand, rooting at the nodes and with oval leaves; white flowers 1.2 cm wide with almost free lobes. Evening flowering.

Dalaghran National Park, 25 km SE of Abha; in granite sand near a stream. 7,000 ft.

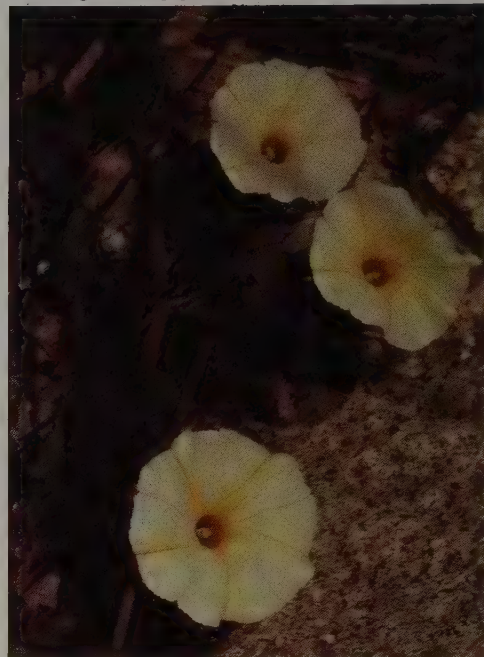




◆ *Ipomoea eriocarpa*

A small leafy vine with stems to 35 cm long; wilting lilac flowers 1 cm wide with darker centre; erect fruits cupped in a flower-like calyx and having a hairy capsule.

14 km north of Muhayl, Jiddah-Jizan road; twining among grasses by roadside. 1,500 ft.



◆ *Ipomoea obscura*

A leafy tangled semi-twining herb with stems to 2 m long; pale yellow flowers 2 cm wide. Fairly widespread especially around Jizan and Jabal Fayfa.

One third of the way up the escarpment, Jiddah-Taif road; on a rocky hillside. 3,500 ft.



◆ *Ipomoea sinensis* ssp. *blepharosepala*

A tangled trailing herb with leafy stems to 1 m long and narrow heart-shaped leaves; pinkish lilac flowers 1.2 cm wide with darker centre. Pendent fruits with a glabrous capsule.

Near sewage works, 10 km south of Jiddah; in a silt-pan. 10 ft.



◆ *Merremia semisagitta*

A prostrate herb with almost leafless stems 50 cm long and narrow leaves; large pale salmon-pink flowers 4 cm wide with red streaks and red centre. Locally fairly common.

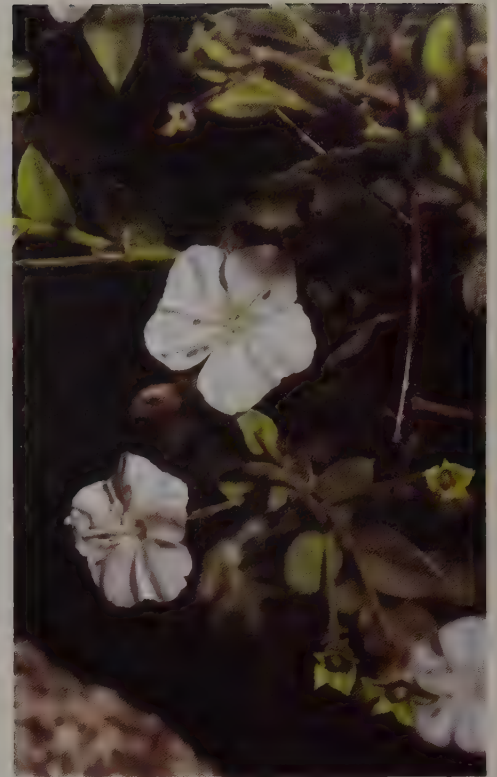
Near sewage-works, 10 km south of Jiddah; on a small sandy bank. 10 ft.



Merremia tridentata* var. *angustifolia ♣

A slender-stemmed tangled vine with stems to nearly 2 m long and narrow leaves; pale yellow flowers 8 mm wide.

Jabal Mershid, 40 km east of Qunfudhah; climbing up shrubs on a sandy plain. 50ft.



Seddera arabica ♦

A twiggly woody herb 25 cm high with small leaves; white flowers 9 mm wide. Widespread in scattered localities in the south.

On the western slopes of Jabal Sawdah, 28 km NW of Abha, on the road descending to Wadi al Uss; on a steep rocky hillside. 6,500 ft.



Seddera virgata ♣

A grazed twiggly herb 30 cm high with very slender stems and tiny narrow leaves; white flowers 8 mm wide. Fairly widespread, especially in the south.

Near the junction with the road to Ad Darb, Abha-Jizan road; on the bank of a shallow wadi. 100 ft.

Seddera latifolia ♦

A grazed twiggly herb 15 cm high with tiny silvery leaves; white flowers 3 mm wide. Fairly widespread in the southern lowlands.

Near the junction with the road to Ad Darb, Abha-Jizan road; on the bank of a shallow wadi. 100 ft.



CRASSULACEAE

This family of mainly succulent leaved plants is not very well represented in Saudi Arabia, there being only a dozen species in the region. All are perennial except the moss-like *Crassula schimperi* and *Sedum hispanicum*; most of the species are found south of Makkah mainly in the mountains, only the *Sedum* and

Umbilicus erectus are found in the northern mountains. The species of *Kalanchoe*, apart from *K. alternans*, are difficult to name precisely, and some authorities lump several species together under *K. laciniata*; in Arabia there may be at least four distinct species in this group. None of the species are scented.



◆ ***Crassula alba*** ◆

A crowded-stemmed herb with leaves in rosettes and flower stems to 8 cm long; white flowers 6 mm wide, in heads. Near Baljurshi this species is hairy and has flower stems nearly 1 m long.

Jabal Sawdah, 28 km NW of Abha; in vertical cracks on the lip of the scarp. 9,200 ft.

◆ ***Kalanchoe citrina*** ◆

An erect pale grey-stemmed herb to 18 cm tall with blue-green dentate leaves, sometimes lobed, the leaves and exterior of flowers white-downy; pale greenish yellow flowers 1 cm wide with rounded petals, in flat heads. The population of this species on Jabal Fayfa has pointed petals.

Wadi al Uss, on the western slope of Jabal Sawdah, NW of Abha; among shrubs. 3,500 ft.



◆ *Crassula schimperi*

A moss-like herb with stems to 8 cm tall; tiny flowers 1 mm wide, in the leaf axils. Fairly widespread in the southern mountains but easily overlooked.

15 km SW of Al Hadda, Jiddah-Taif road, on a red granite mountain near the lip of the scarp; in a shady crevice. 7,000 ft.



◆ *Kalanchoe alternans* ◆

A succulent-leaved herb with nodding flower stems 30 cm high, the whole plant, including the flowers, a pale pinkish-fawn; flowers 1.5 cm long, tubular, with curled lobes, colour slightly variable. Locally abundant in the southern Asir.

Between Khamis Mushayt and Suq al Ithnayn; among pink granite rocks. 7,500 ft.



Kalanchoe crenata ▲

An erect pubescent herb with rounded stems 1.5 m long and dentate leaves having a distinct petiole; orange-yellow flowers 1 cm wide with pointed petals.

Jabal Fayfa, 100 km NE of Jizan; on steep rocky slope, among shrubs. 4,800 ft.



Kalanchoe* sp. aff. *glaucescens ▲

An erect succulent-leaved herb with stems to 1 m long; deep yellow flowers 7 mm wide. Very widespread on Jabal Fayfa.

Halfway down the escarpment, Abha-Jizan road; on a rocky hillside, among shrubs. 4,000 ft.



Kalanchoe glaucescens ▲

An erect succulent-leaved herb with stems 1 m long and glabrous blue-green leaves edged with crimson; pinkish red flowers 8 mm wide, in erect heads.

Jabal Abu Hassan, an isolated sandstone-topped mountain off the edge of the escarpment south of Abha; among bushes on the summit plateau. 5,300 ft.



Kalanchoe* sp. aff. *laciniata ▲

An erect single-stemmed herb with trifoliate deeply-toothed compound leaves and flower stems 1 m tall; pale yellow flowers 6 mm wide.

Wadi al Uss, on the western side of Jabal Sawdah, 28 km NW of Abha, near the Police Post; among rocks and bushes in a well-wooded ravine. 3,200 ft.



Kalanchoe lanceolata ◆

An erect square-stemmed succulent herb 40 cm tall with glabrous dentate-margined leaves, the winged petioles clasping the stem; the terminal flower spike is round and hairy with narrow hairy leaves; yellow flowers 6 mm wide, in crowded heads.

Grandi Lavori road, 23 km from its junction with the Jiddah-Jizan road; at base of granite hills in shade of dense bushes. 2,500 ft.

Umbilicus horizontalis* var. *intermedius ◆

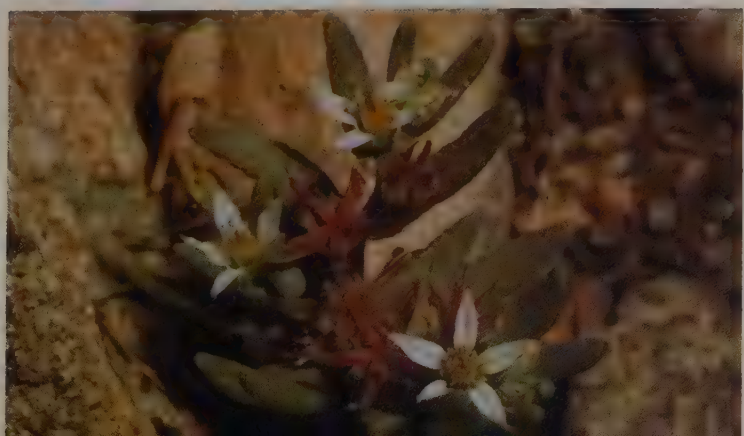
A fleshy herb 13 cm high with round slightly notched leaves; reddish tubular flowers 7 mm long. Very widespread in the southern mountains.

Near the edge of the escarpment, 15 km SW of Al Hadda, Jiddah-Taif road; in a shady crevice. 7,000 ft.

Sedum hispanicum ◆

A small fleshy-leaved herb 5 cm high; star-like white flowers 7 mm wide with a pink stripe down the centre of each petal. In scattered localities in the mountains.

Jabal Sawdah, 28 km NW of Abha; in a rock crevice on the extreme lip of the escarpment. 9,000 ft.



Umbilicus erectus ◆

A very fleshy-leaved herb, the round red dotted leaves fairly deeply notched and with flower stems to 25 cm tall, occasionally branched; pale green flowers 8 mm long, the petals tipped with crimson.

Jabal Dabbagh, a 7,500 ft. granite massif 88 km SW of Tabuk; in a shady crevice. 5,500 ft.



CRUCIFERAE

This economically important family, which includes many crop plants such as cabbage and oilseed rape, is well represented in Saudi Arabia, there being nearly 60 species found by the author. Though found in greater numbers in the north, where plants of *Lepidium aucheri* or *Eremobium lineare* form a green carpet covering several acres after rains, nearly half the species occur occasionally in the south. Most species are annual herbs though *Farsetia aegyptia* is woody stemmed and the almost leafless spiny *Zilla spinosa* is a shrublet.



Alyssum desertorum ▲

A dwarf leafy herb to 6 cm tall; yellow flowers 1 mm wide; slightly ovate flat fruits with an apical spike.

Queen's Forest, Al Bahah, off the Taif-Abha road; under junipers on lip of escarpment. 7,000 ft.

Alyssum homalocarpum ▼

A small branching herb 10 cm tall with grey hairy leaves; tiny yellow flowers 1 mm wide; no scent; circular fruits. Fairly widespread, especially in the mountains.

Jabal Dabbagh, a 7,500 ft granite mountain 88 km SW of Tabuk; on a rocky spur. 5,500 ft.



The shape of the flowers is very characteristic: four petals arranged in a cross, cruciform, hence the name of the family. In some genera it is difficult to assign specific names without observing the fruits as well as the flower, and studying the shape of the fruits may help identify plants of similar appearance in the field.



Alyssum linifolium ▲

A small bushy herb 9 cm tall with narrow mealy leaves; tiny yellowish flowers less than 1 mm wide; no scent; oval flat fruits.

20 km NW of Turayf Camp (31° 40' N, 39° 29' E); in a sandy runnel on limestone plateau. 2,900 ft.

Anastatica hierochuntica ▼

A many-branched leafy herb 15 cm high; tiny white flowers 3 mm wide; no scent; fleshy pagoda-like fruits. In the dry season the persistent leaf-stems curl around the fruits. A very widespread herb.

Near Nabhaniyah, 100 km SW of Buraydah; in a fallow field. 2,300 ft.



Arabidopsis thaliana ◆

A slender herb 15 cm high; white flowers 2 mm wide; no scent. Widespread in the southern mountains in early spring.

One third of the way up the escarpment, Taif-Jiddah road; on a rocky hillside. 3,500 ft.

Arabidopsis kneuckeri ◆

A small herb 10 cm high with mealy leaves and stems; pink flowers 4 mm wide; no scent. Locally common.

Jabal Sawdah, 28 km NW of Abha; near the lip of the escarpment. 9,000 ft.

***Arabis alpina*** ◆

A leafy herb 23 cm high; relatively large white flowers 1.5 cm wide; sweet scent.

Jabal Sawdah 28 km NW of Abha; near a stream on the lip of the escarpment. 9,000 ft.





***Arabis* sp. ◆**

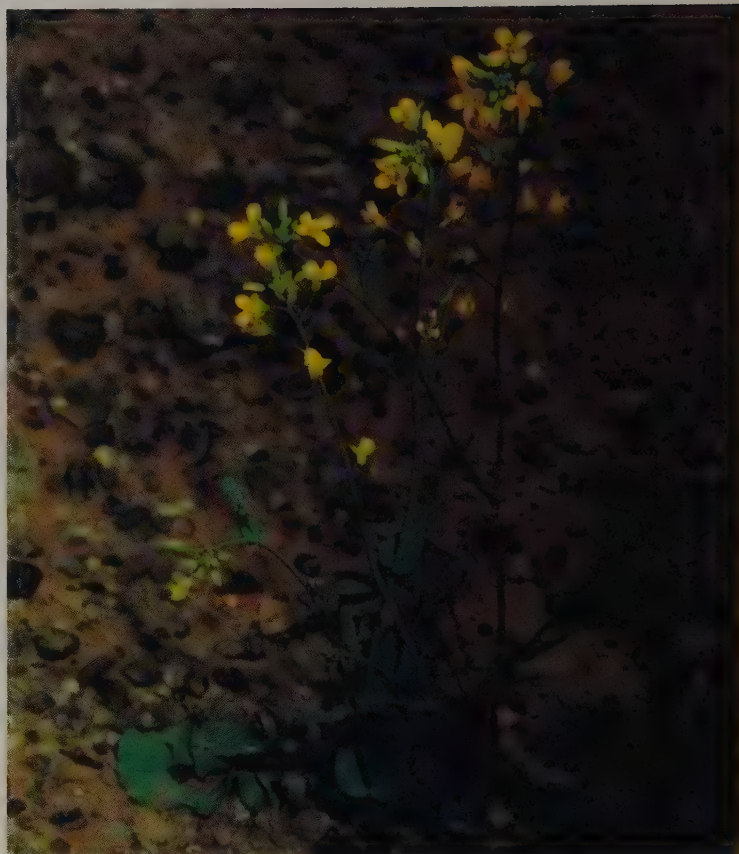
A small herb 7 cm high; tiny white flowers 2 mm wide; no scent.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; in damp sand. 5,500 ft.

***Biscutella didyma* ◆**

A delicate erect herb 13 cm high with dentate leaves; yellow flowers 5 mm wide; no scent; flat circular fruits in pairs.

Lip of the escarpment, near the Police Post, Taif-Jiddah road; in shade. 6,300 ft.



***Brassica rapa* ◆**

A branching herb with stems to 30 cm long and with glabrous leaves, those on the stem clasping the stem; deep yellow flowers 1 cm wide; sweet scent; slender erect fruits.

12 km west of Turayf Camp (31° 40'N, 39° 29'E); in hard sand near claypan. 2,900 ft.



***Brassica tournefortii* ◆**

An erect herb with hairy stems to 22 cm long and a basal rosette of slightly hairy deeply dissected leaves; yellow flowers 8 mm wide; no scent.

Near Jabal Ibrahim, off the Taif-Abha road; in damp sand near a stream. 6,500 ft.



Cakile arabica ◆

A leafy-based herb 30 cm tall with deeply lobed leaves; deep lilac flowers 1 cm wide; no scent.

Among red sandstone buttes 20 km north of Shiqri, on the road to Tabuk; in hard sand. 3,100 ft.

Capsella bursa-pastoris ◆

A leafy herb 10 cm high; tiny white flowers 1.5 mm wide; no scent. Widespread in scattered localities in the southern mountains near streams.

The waterfall beauty-spot between Ahba and Jabal Sawdah; by the stream. 8,500 ft.



Cardaria draba ◆

An erect leafy herb 40 cm high; white flowers 3 mm wide, in dense heads; sweet scent. A fairly common weed of wheatfields in the southern mountains.

Ring road from Jabal Sawdah to the main Taif-Abha road; on edge of cultivation. 8,500 ft.

Carrichtera annua ◆

A branching leafy hairy herb with deeply dissected leaves; creamy flowers 5 mm wide with brown veins; no scent; short-hairy fruits with flat arrow-shaped glabrous tip.

180 km SSW of Turayf Camp, near Turayf; in sandy wadi in basalt. 2,300 ft.



Chorispora purpurascens ◆

A bushy leafy herb with ascending stems 14 cm long and velvety lobed leaves; lilac flowers 1.2 cm wide; faint scent; rough cylindrical fruits, the apical $\frac{1}{4}$ smoother and narrower.

12 kmsouth of Turayf Camp (31° 40' N, 39° 29' E); in claypan. 2,900 ft.

Clypeola jonthlaspi ◆

A delicate erect herb 7 cm high; tiny yellow flowers 1 mm wide; crowded flat, round fruits.

Lip of the escarpment, Taif-Jiddah road; in shade. 6,500 ft.

***Diplotaxis acris*** ◆

A leafy-based sparsely branching herb 30 cm high; lilac flowers 1.5 cm wide; no scent. A very widespread herb in the north.

Near Uqlat as Suqur, off the Madinah-Qassim road; among rocks. 2,850 ft.

***Diplotaxis erucoides*** ◆

A leafy herb with ascending rough-textured stems 25 cm long and with lobed leaves having the margins dentate; white flowers 1 cm wide; no scent; cylindrical fruits with a short flared apex.

12 km west of Turayf Camp (31° 40' N, 39° 29' E); in hard sand near claypan. 2,900 ft.

◆ *Diplotaxis harra*

A branching hairy herb 60 cm high; yellow flowers 1 cm wide; strong sour smell. Very variable, the plant sometimes completely glabrous. Fairly widespread.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; on a rocky hillside, 3,000 ft.



◆ *Eremobium aegyptiacum*

A bushy branching leafy herb 20 cm high; white flowers 3 mm wide; no scent.

Near Zabirah, 200 km north of Buraydah; among drifted red sand dunes, 1,800 ft.



◆ *Diplotaxis harra*; glabrous form



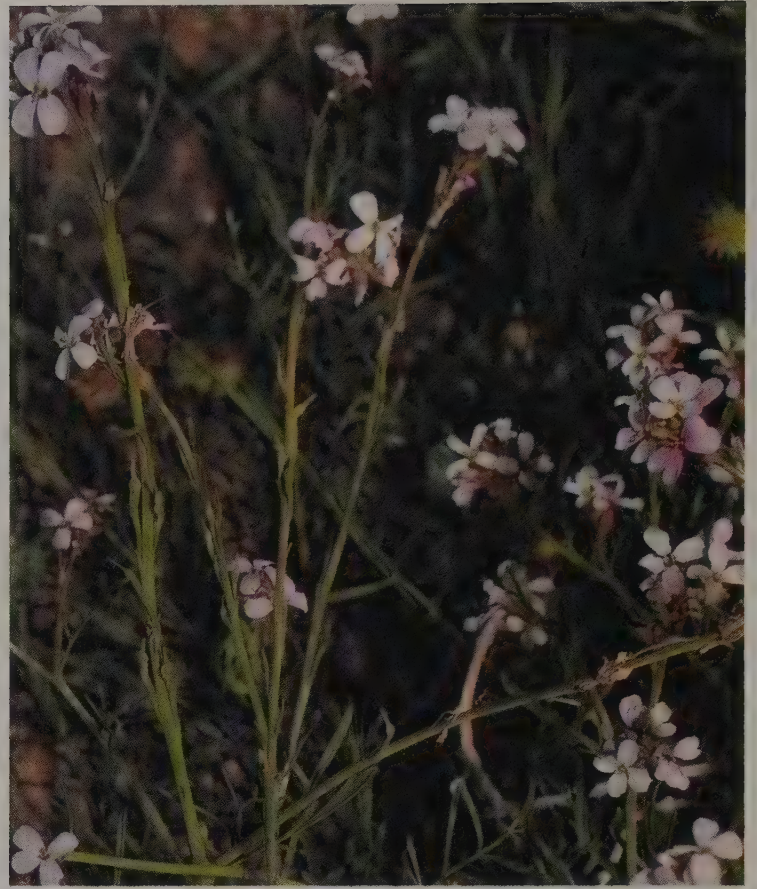
◆ *Eremobium aegyptiacum* ssp. *lineare*

A small herb 8 cm high branching from the base; white and lilac flowers 8 mm wide; no scent. A very widespread herb in the north.

Sandstone ravines 160 km SW of Tabuk; in hard red sand, 2,800 ft.



Erucaria crassifolia ◆◆



Erucaria hispanica ◆◆



Eruca sativa ◆

A many-branched herb nearly 1 m tall; creamy flowers 2 cm wide with dark green veins; no scent. Probably an escape of cultivation.

Between Al Bahah and Baljurshi, Taif-Abha road; by the roadside. 6,500 ft.

◆ ***Erucaria crassifolia***

An erect branching herb 45 cm tall with deeply lobed leaves; lilac flowers 8 mm wide; no scent.

Near Riyadh al Khabra, SW of Buraydah; in a fallow field. 2,200 ft.

◆ ***Erucaria hispanica***

A stemmy branching herb 60 cm high with narrow deeply lobed leaves; lilac flowers 5 mm wide; sweet scent; two-seeded constricted fruits.

Wadi Sabha near Zabirah, 200 km north of Buraydah; in a lush valley at the edge of a limestone scarp. 1,800 ft.

***Erucastrum arabicum*** ◆

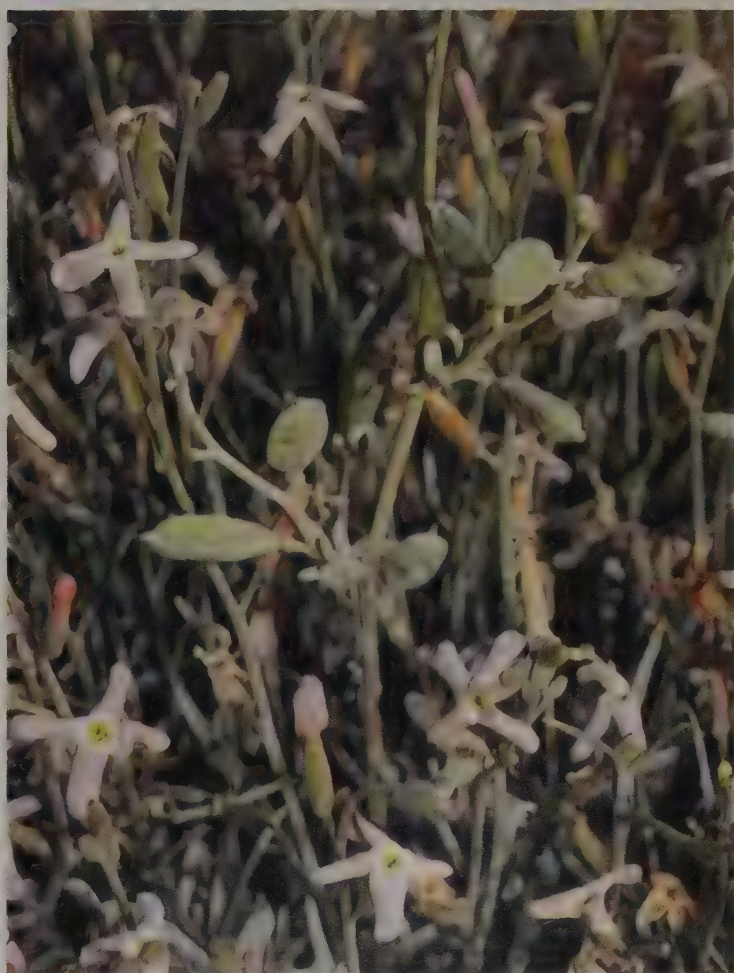
A leafy herb 35 cm tall; small yellow flowers 4 mm wide; no scent; long narrow fruits.

Najran; in a fallow field. 4,500 ft.

Farsetia aegyptia ◆

A woody-based herb to 30 cm tall with thin greyish stems and leaves; brownish flowers 1.4 cm wide with rolled petals; no scent; flat, almost circular, soft-hairy fruits. Widespread in the north.

Near Nabhaniyah, 100 km SW of Buraydah; on a stony hillside. 2,300 ft.





Farsetia burtonae ➤

A leafy herb with greyish leaves and stems to 13 cm long; white and rosy-lilac flowers 8 mm wide; no scent. Fairly widespread in the north.

A sandstone outcrop 97 km west of Buraydah; in hard sand among rocks. 2,800 ft.



Farsetia ramosissima ➤

A branching semi-prostrate weak-stemmed herb to 35 cm tall; white flowers 5 mm wide; fairly short fruits. Locally widespread.

Low rocky hills, 10 km east of Jiddah; in hard sand. 80 ft.



Farsetia longisiliqua ➤

A twiggily almost leafless herb 50 cm tall; whitish lilac flowers 1 cm wide; long narrow fruits; no scent. A very widespread plant especially in the lowlands.

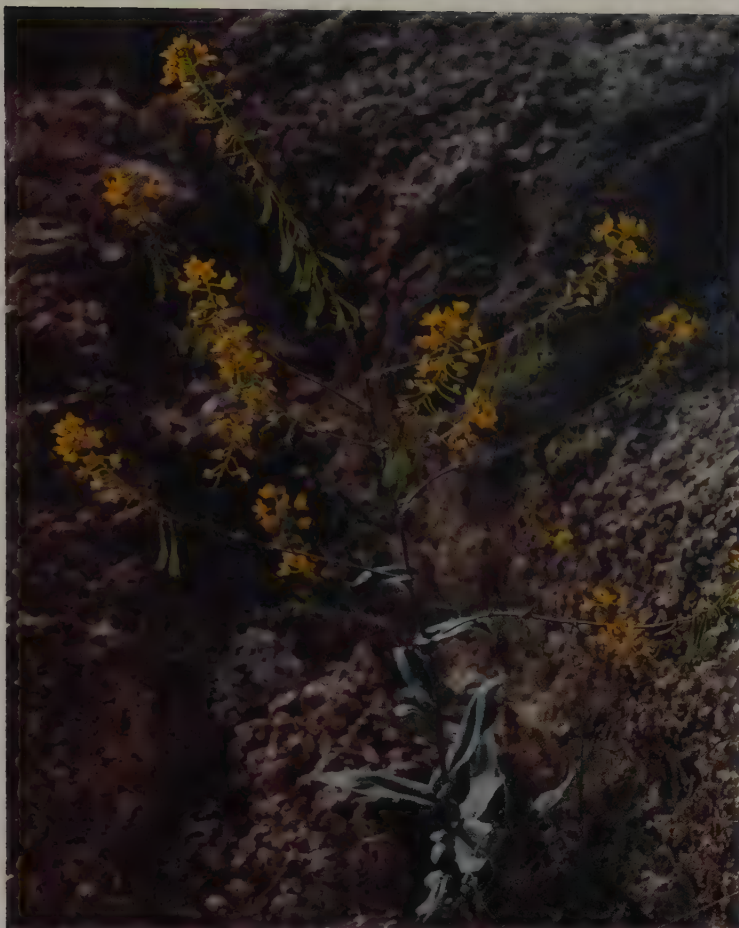
Near Madinah; in hard sand by the roadside. 2,000 ft.



Horwoodia dicksoniae ➤

A leafy-based herb with ascending stems 20 cm long; deep lilac flowers 8 mm wide; sweet scent; large round winged fruits. Locally abundant.

Near Zabirah, 200 km north of Buraydah; in hard sand. 1,800 ft.



◆ *Isatis lusitanica*

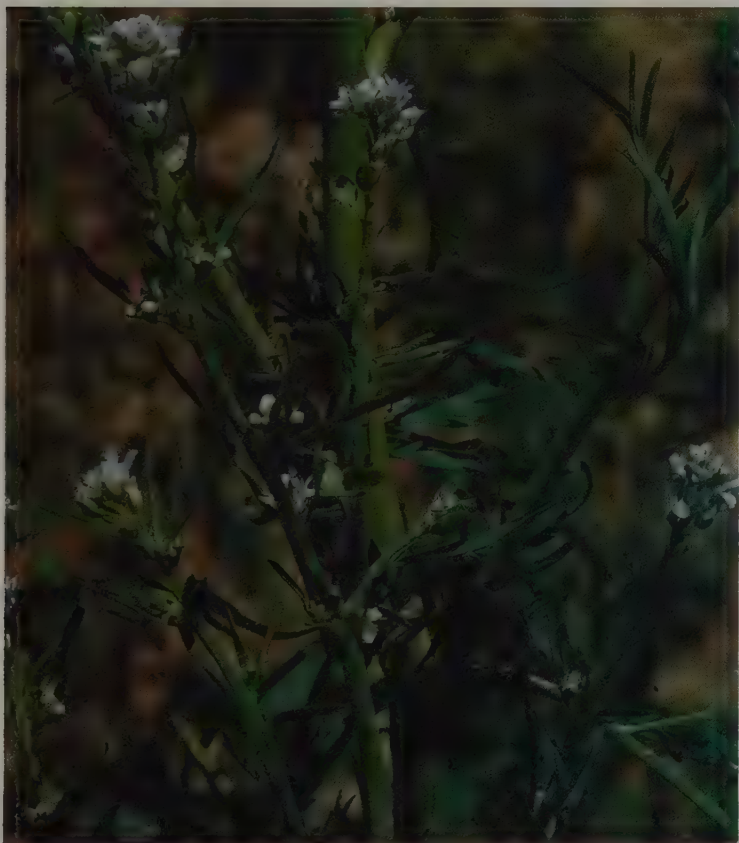
An erect leafy herb 20 cm high; yellow flowers 5 mm wide; no scent.

Aban al Ahmar, a granite massif SW of Buraydah; in a small date grove near the summit. 3,800 ft.

◆ *Lepidium aucheri*

A leafy herb 10 cm high; tiny white flowers 1 mm wide; no scent. Locally very abundant, carpeting the ground.

Near Zabirah, 200 km north of Buraydah; in a large claypan. 1,800 ft.



◆ *Lepidium sativum*

A slender erect herb 30 cm tall; tiny white flowers 2.5 mm wide; no scent. A variable plant; it is much larger when a weed of cultivation.

95 km south of Baljurshi, Taif-Abha road; in the juniper zone, among rocks. 7,300 ft.



◆ *Lobularia libyca*

A prostrate herb with narrow leaves and radiating stems to 20 cm long; white flowers 3 mm wide; flat circular fruits; no scent.

Wadi Turabah, 5 km upstream from Taif-Al Bahah road; in damp sand. 6,500 ft.



Malcolmia chia ◆

An erect leafy herb with stems to 20 cm long; pale lilac and white flowers 7 mm wide; no scent; erect narrow fruits 6 cm long.

Near Jabal Ibrahim, off the Taif-Abha road; in shady crevice at foot of cliff. 6,800 ft.

Malcolmia crenulata ◆

A dwarf cushion herb 4 cm tall with narrow slightly dentate leaves; rosy-lilac flowers 2 cm wide with a yellow centre; no scent; slightly flattened narrow fruits 4 cm long.

40 km NW of Turayf Camp (31° 40' N, 39° 29' E); in silt of claypan. 2,900 ft.



Malcolmia grandiflora* var. *glabrescens ◆

An erect herb branching from the base with stems to 45 cm long and a basal rosette of dentate leaves; deep rosy-lilac flowers 1.2 cm wide with darker centre; strong sweet honey scent; the long thin fruits are curled. Locally abundant.

180 km east of Thaniyat Camp, near Turayf; in drifted sand in crevices of limestone outcrop. 2,500 ft.





***Malcolmia* sp. ◀**

An erect leafy herb 15 cm high; yellow flowers 1 cm wide with almost round petals; sweet scent.

A valley in Jabal Ash Shati range, 60 km west of Tabuk; near a stream. 4,000 ft.



***Matthiola longipetala* ◀**

A leafy-based herb 30 cm tall; pinkish flowers 2 cm wide with deep rosy-edged wavy petals; no scent. Abundant in scattered localities in the north.

Near Nabhaniyah, 100 km SW of Buraydah; in hard sand. 2,800 ft.

***Morettia canescens* ▶**

A branching prostrate herb with stems to 15 cm long and small leaves; white and pale lilac flowers 3.5 mm wide; no scent.

15 km south of Wadi Turabah, Taif-Abha road; in a silt pan. 5,500 ft.



***Maresia pygmaeus* ▶**

A small bushy herb with both simple and dentate leaves and flower stems to 5 cm long; pale lilac flowers 6 mm wide, the back of the petals darker; no scent.

Near Zabirah, 200 km north of Buraydah; on steep side of large red sand dune. 1,900 ft.





Morettia parviflora ♀

A leafy herb 12 cm high; white flowers 3 mm wide; no scent. A widespread and very variable plant.

Low rocky hills, 10 km east of Jiddah; in hard sand. 80 ft.



Neslia apiculata ♀

A slender single-stemmed erect herb to 25 cm tall with narrow pointed leaves along the stem; yellow flowers 2 mm wide; no scent; small spherical fruits with a pointed tip.

Between Jabal Ibrahim and Suq ar Rubu, off the Taif-Abha road; in a fallow field. 6,800 ft.



Moricandia sinaica ♀

A sparsely branching herb 75 cm tall with thick brittle glaucous leaves clasping the stem; pinkish lilac flowers 1 cm wide; no scent; narrow cylindrical fruits to 7 cm long.

The new Abha to Muhayl road, 5 km from the summit; in rubble in a shady ravine. 7,000 ft.



Nasturtium officinale ♀

A leafy semi-prostrate herb with stems to 10 cm long; white flowers 5 mm wide; slightly aromatic; watercress. Fairly widespread in the mountains, especially in the south.

Wadi Wejj, 25 km SW of Taif; in a shallow stream. 6,800 ft.



Notoceras bicorne ◆

A prostrate leafy herb 3 cm high; greenish-yellow flowers 2 mm wide; distinctive narrow fruits capped with two small 'horns'. Widespread.

One third of the way up the escarpment, Taif-Jiddah road; in damp sand. 3,500 ft.

Raphanus sativus ◆

A branching leafy herb 80 cm high; bright purplish flowers 1.6 cm wide; no scent.

In Najran; a weed in a wheatfield. 4,500 ft.



◆ ***Physorrhynchus* sp. aff. *chamaerapistrum***

A bushy herb nearly 1 m tall; large white flowers 1.8 cm wide; no scent.

Among sandstone ravines 190 km SE of Sawawin, SW of Tabuk; in hard sand. 2,000 ft.



Savignya parviflora ◆

A slender erect herb 25 cm tall; pale pink flowers 6 mm wide; no scent; flat oval fruits on long pedicels. Widespread in scattered localities in the north.

Near Nabhaniyah, 100 km SW of Buraydah; in hard sand. 2,800 ft.



Schimpera arabica ◆

An erect crowded twisted-stemmed bushy herb 33 cm high; yellow flowers 2 mm wide; peppery smell. The distinctive narrow fruits have a swollen base. Locally widespread in the north.

Near Zabirah, 200 km north of Buraydah; in hard sand. 1,800 ft.



Sinapis arvensis ◆

An erect sparsely branched leafy-based herb 38 cm high; yellow flowers 7 mm wide; no scent.

Near Zabirah, 200 km north of Buraydah; in hard sand. 1,800 ft.



Schouwia purpurea ◆

A bushy leafy herb 65 cm high; deep rosy flowers 8 mm wide, in spikes; no scent; almost round flat fruits. Some populations have white flowers.

Wadi Fatimah, near Jumum; near an irrigation ditch, in sand. 500 ft.



Sisymbrium erysimoides ◆

A very leafy herb with ascending stems 45 cm long, the lobed leaves with dentate margins; yellow flowers 2 mm wide; no scent.

Jabal Fayfa, 100 km NE of Jizan; in shade on a steep rocky hillside. 5,400 ft.



Sisymbrium irio ◆

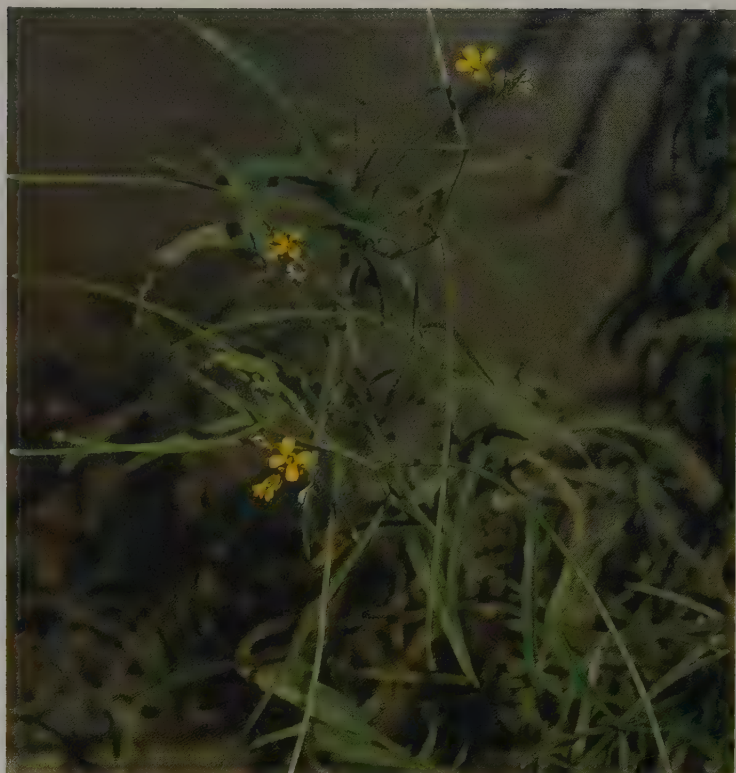
A slender herb 10 cm tall; tiny yellow flowers 1 mm wide; no scent. Widespread in the southern mountains.

Wadi Liyyah, 30 km south of Taif; in hard sand. 5,000 ft.

Sisymbrium loeselii ◆

A downy white-hairy herb to 50 cm tall with lobed leaves; yellow flowers 1.5 cm wide; sweet scent; very thin erect fruits.

12 km west of Turayf Camp (31° 40'N, 39° 29'E); in sandy runnel near claypan. 2,900 ft.



Sisymbrium orientale ◆

An erect sparsely branched herb 23 cm tall with white-downy deeply lobed leaves, the apical portion almost hastate; yellow flowers 7 mm wide; erect narrow cylindrical fruits.

Near Al Hadda, off the Jiddah-Taif road; in fallow field, near cultivated ground. 6,800 ft.

Sisymbrium septulatum ◆

An erect branching herb 35 cm tall with very deeply dissected hairy leaves, the margins of the lower leaves dentate; yellow flowers 1.5 cm wide; very sweet scent; long slender cylindrical fruits with a bifurcate tip.

12 km west of Turayf Camp (31° 40'N, 39° 29'E); in hard sand near a claypan. 2,900 ft.





◆ ***Torularia torulosa***

A leafy bushy herb with stems 15 cm long and with wide-dentate narrow leaves; white flowers 1.5 mm wide; no scent; slender cylindrical fruits which corkscrew.

8 km NW of Turayf Camp (31° 40'N, 39° 29'E); in thin sand on limestone plateau. 2,900 ft.

◆ ***Zilla spinosa***

A dense bushy very spiny shrublet 65 cm high; pale lilac flowers 1.4 cm wide; no scent. A very widespread plant in the north.

Near Nabhaniyah, 100 km SW of Buraydah; in hard sand near a fallow field. 2,300 ft.



CUCURBITACEAE

Although most members of this family are tendril-bearing vines at least two, *Citrullus colocynthis* and *Cucumis prophetarum*, seldom if ever climb. The very bitter *C. colocynthis*, which the author has never seen grazed, is also exceptionally deep-rooted and flourishes with flowers and fruits even at the height of summer. Most of the wild Cucurbitaceae species have fruits

that are bitter and inedible, but the tiny fruits of *Zehneria anomala* are sweet and the red jelly surrounding the seeds of the foul smelling fruits of *Momordica balsamina* is edible. The Bedou are reputed to prepare a violent-acting aperient by pouring milk into the empty husk of *C. colocynthis* and leaving overnight before swallowing.



Citrullus colocynthis ◆ ◆

A prostrate vine with stems to 2 m long; yellow flowers 8 mm wide; smooth round bitter fruits yellow when ripe. Very widespread in the whole region.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; in hard sand. 2,000 ft.





Citrullus lanatus ◆

A prostrate vine with stems to 2 m long, clothed with hairs; yellow flowers 1.5 cm wide; edible; a watermelon.

Low rocky hills, 10 km east of Jiddah; by a track. 80 ft.

Coccinea grandis ◆

A tangled leafy vine; short-hairy creamy flowers 4 cm wide with pale green veins; no scent. Widespread especially in the Asir and southern Hijaz. The leaf shape is variable.

Near the bottom of the escarpment, Abha-Jizan road; climbing to 2 m over shrubs in a rocky ravine. 3,500 ft.



Corallocarpus epigeus ◆

A tangled vine with stems 2 m long and deeply lobed palmate leaves; pale yellow flowers 3 mm wide.

Wadi al Uss, west of Jabal Sawdah; near the Police Post, scrambling over shrubs on a steep bank. 3,000 ft.

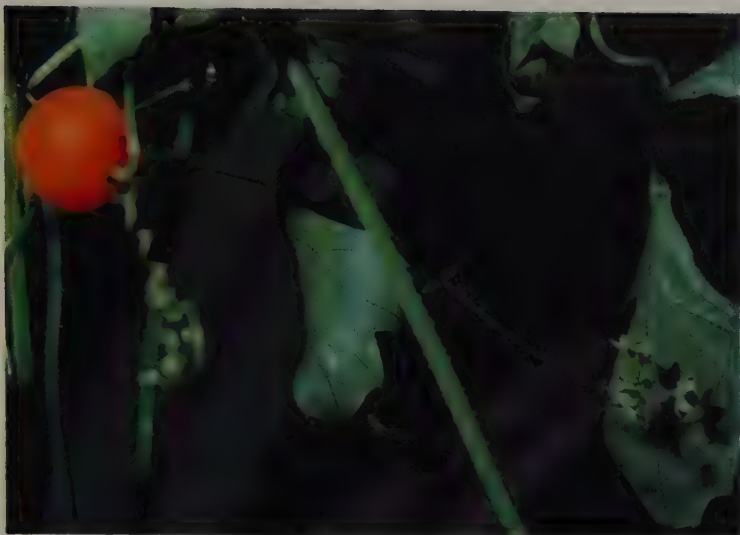


Corallocarpus schimperi ◆ ◆

A thick-stemmed vine with tendrils; greenish male flowers 3 mm wide, on long peduncles; no scent; red chilli-like fruits 3 cm long.

Jiddah-Muhayl-Jizan road, 400 km south of Jiddah; climbing to 5 m high over an acacia, in hard sand. 1,200 ft.





◆ *Ctenolepis cerasiformis*

A leafy vine with tendrils; pale green flowers 3 mm wide; no scent; globular pale red fruit.

Al Aridah, near Jizan; in a grove of *Pandanus*. 800 ft.

◆ *Cucumis melo* var. *agrestis*

A leafy vine with tendrils and coarse white-hairy stems to 2 m long; yellow flowers 1.2 cm wide; no scent; smooth oval fruits 4 cm long.

Near Ad Darb on the Jiddah-Jizan road; on a small rocky outcrop, among shrubs. 200 ft.



◆ *Cucumis figarei*

A leafy prostrate vine with tendrils, the radiating stems 1 m long; yellow flowers, the female 2.5 cm wide and the male 1.5 cm wide. The oval fruits are covered with warty tubercles and have sweet-smelling flesh.

Wadi al Uss, west of Jabal Sawdah, 20 km NW of Police Post; in hard sand. 2,700 ft.



◆ *Cucumis melo*

A prostrate leafy vine with tendrils, the slightly lobed leaves 11 cm long and the stems to 1 m long; yellow flowers 2.5 cm wide; almost hairless oval fruit, green with darker freckles.

Low rocky hills, 10 km east of Jiddah; near a track, in hard sand. 80 ft.



Cucumis prophetarum* var. *dissectus ◆
A prostrate leafy vine with stems 1.5 m long; yellow flowers 8 mm wide; green-striped fruit with long soft spines.

Near Suq al Ahad, Qunfudhah; in damp sand near cultivation. 100 ft.



Cucumis* sp. aff. *prophetarum ◆

A leafy vine climbing by tendrils with stems to 3 m long and the whole plant covered with fine bristles, pointing down on the stem; distinctive narrow leaves, with two to three pairs of opposite points; yellow green-veined flowers 7 mm wide.

Abu Arish, 30 km SE of Jizan; at the edge of an abandoned field. 500 ft.



Kedrostis foetidissima ◆

A tangled leafy vine with pendent stems 1 m long; yellow flowers 5 mm wide; radish-shaped pointed red fruits.

Jabal Fayfa, 100 km NE of Jizan; on a stone retaining-wall. 5,400 ft.



◆ ***Cucumis prophetarum* var. *prophetarum***

A branching leafy prostrate vine with lobed palmate leaves and stems coarsely hairy, the hairs pointing upward; yellow flowers 8 mm wide; short spined green-striped fruit yellow when ripe. A very variable and widespread plant. The leaves are sometimes entire.

Near Najran; by the roadside. 4,500 ft.



Kedrostis gijef ◆◆

A corky-barked vine with stems to 3 m long and with rather coarse palmate leaves; pale green male flowers 7 mm wide with darker veins, female flowers yellowish; no scent.

Jabal Mershid, 40 km east of Qunfudhah; in hard sand, climbing by tendrils through an acacia. 50 ft.

Momordica balsamina ◆

A tangled leafy vine; yellow flowers 2 cm wide; sour smell; poisonous orange fruits but the red jelly covering the seed is edible. Fairly widespread in the southern lowlands near cultivated ground.

Wadi Khulays, 75 km NNE of Jiddah; climbing over shrubs to 3 m high, at the edge of cultivation. 200 ft.



Zehneria anomala ◆

A slender vine with tendrils and fleshy palmately lobed leaves; small greenish flowers 5 mm wide arising from woolly nodes; deep orange berries with a sweet taste and cucumber smell.

Low rocky hills, 10 km east of Jiddah; climbing over low shrubs, in small rocky ravine. 80 ft.

◆ ***Zehneria scabra***

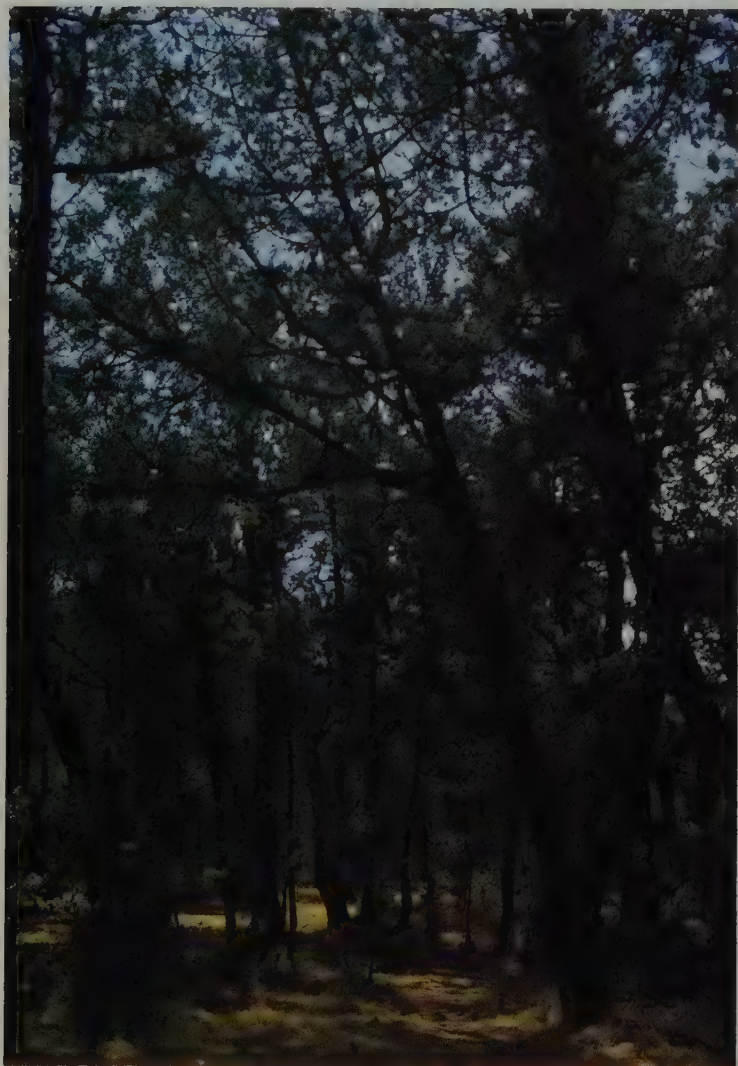
A tangled leafy vine; creamy flowers 3 mm wide; no scent. Fairly widespread in the Asir.

100 km south of Baljurshi, Taif-Abha road; climbing to 3 m high over an acacia, in hard sand by the roadside. 6,100 ft.

CUPRESSACEAE

The two juniper species in western Saudi Arabia are usually shrubby trees due to lopping, but trees more than 8 m tall can be found. Junipers grow in the high mountains and need mist or cloud in addition to the cooler air of high altitude. Indeed, in the southern Hijaz, the juniper zone is a clearly defined belt about a mile wide along most of the lip of the escarpment. There is evidence that at one time the juniper belt was more extensive, but thousands of years ago many forests were felled to heat furnaces to smelt iron, copper, and other metals.

It is particularly interesting that the northern species, *Juniperus phoenicea*, occurs as far south as the northwest-facing lip of the Taif escarpment, where it grows together with the southern *J. excelsa*; *J. phoenicea* occurs on Jabal Radwa and other high peaks near Madinah and on Jabal Dabbagh, over 800 km to the north. The flowers are unisexual, male and female usually on separate plants.



Juniperus excelsa ◆◆

A bushy tree 4 m high; aromatic blue-black fruits with white 'bloom', 6 mm diameter. Widespread in the Asir and southern Hijaz.

15 km SW of Al Hadda, near Taif; on a red granite mountain. 7,000 ft.





Juniperus phoenicea ◆◆

A bushy tree 3 m high; aromatic brownish fruits. This is the farthest south that this northern plant has been found. Fairly widespread in mountains more than 5,000 ft. high north of Makkah.

15 km SW of Al Hadda, near Taif; on a red granite mountain, 7,000 ft.



CYNOMORIACEAE

This family, the members of which look so unlike flowering plants that they used to be known as Maltese Mushrooms, has only one genus and one (possibly two) species. These are found in a narrow belt across temperate Eurasia and the Mediterranean region. *Cynomorium coccineum* is a root parasite on a variety of hosts but most commonly on saltbushes of the Chenopodiaceae family. Much of the plant is underground with only thick simple flowering stems above ground. The tiny flowers are polygamous, male, female and bisexual flowers occurring on the same plant. In Saudi Arabia the plant seems confined to the north and appears only after rains.

◆ ***Cynomorium coccineum*** ◆◆

An erect fungus-like dark red plant 14 cm high, often crawling with ants; no smell.

20 km north of Shiqri, Tabuk road; parasitic on the roots of *Hammada salicornica*, on a small dune among red sandstone buttes, 3,100 ft.



CYPERACEAE

Members of this family are found throughout the region, *Cyperus* colonises mainly rocky ground and sand dunes and *Carex* and *Scirpus* prefer stream beds and the margins of pools.

The Cyperaceae, though resembling grasses, are not closely related to them; the small inconspicuous flowers, male and female on the same plant, are usually arranged in spikelets.



Carex divisa ◆

A mat-forming herb with creeping underground stolons, a basal rosette of leaves and triangular flower stems 15 cm long; pale brown flowers with long brown stigmas, clustered in a short spike-like head which is subtended by one short bract.

Adh Dhahna waterfall near Tannumah, Taif-Abha road; in damp sand near a ditch. 6,500 ft.

◆ ***Carex distans***

A grass-like herb 25 cm high; the male flowers are at the apex of the stem, above the cylindrical fruiting bodies which are 1.5 cm long.

The waterfall beauty-spot, off the Abha-Jabal Sawdah road; by the stream. 8,500 ft.



Cyperus alopecuroides ◆

A tufted reed with three-angled stems 1 m tall; very coarse flowers in clustered spikes, in loose heads subtended by three long bracts.

Head of the dam, Abu Arish, near Jizan; in damp sand. 500 ft.



Cyperus articulatus ◆

A leafless reed with stems 1 m high; clustered flowering heads on long stalks from the apex of the stem.

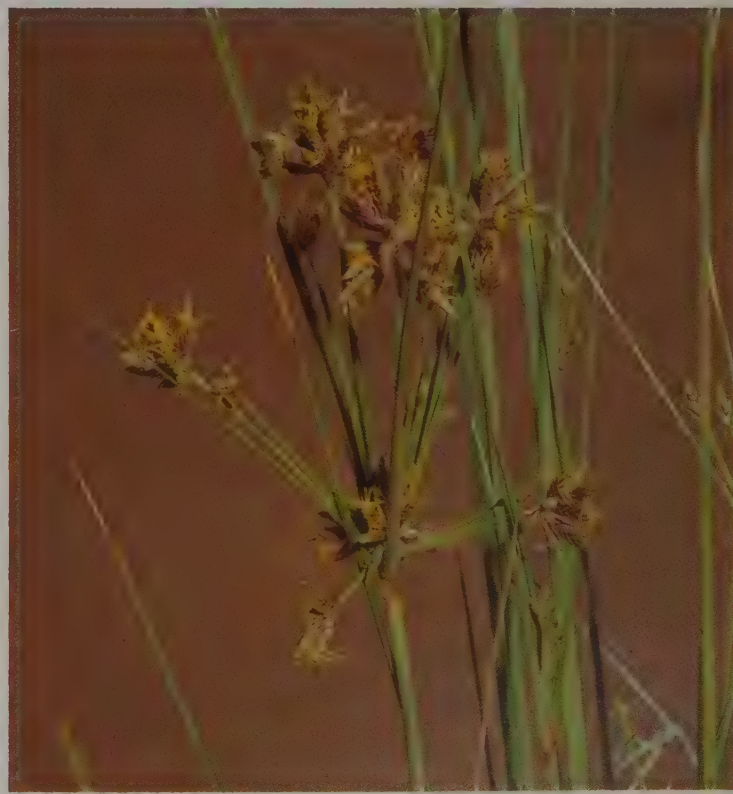
Al Aridah, near Jizan; at the edge of a *Pandanus* grove. 800 ft.



Cyperus alternifolius* ssp. *flabelliformis ◆

A leafy herb growing in large clumps with flower stems to 1 m long; in fruit; fruits clustered in heads at the apex of the stem and subtended by a rosette of long leaf-like bracts.

Wadi Turabah, between the Taif-Al Bahah road and Jabal Ibrahim; in damp sand edging permanent pools of water. 5,600 ft.



Cyperus aucheri ◆

A stout erect pale green hollow-stemmed herb to 1 m high; flower spikes in crowded heads 3 cm in diameter. Very widespread in sand dunes.

Near Zabirah, 200 km north of Buraydah; in red sand dunes. 1,800 ft.



***Cyperus conglomeratus* ♣**

A grass-like herb 15 cm high with stiff terete leaves; coarse-hairy flower spikes in clustered heads. Locally widespread.

Near low hills east of Jiddah; in drifted sand. 80 ft.



***Cyperus jeminicus* ♣**

A tufted herb with stiff curved leaves 7 cm long and stems 11 cm long; flower spikes 1.2 cm long, in loose heads. Similar to *C. conglomeratus* but with rigid pointed leaves.

70 km north of Jiddah; in hard sand near the sea. 3 ft.



***Cyperus conglomeratus* var. *effusus* ♣**

A herb with grass-like leaves and stems 10 cm tall; flower spikes in almost spherical heads 1.2 cm wide.

On the Jiddah road, 26 km north of Al Lith; among granite outcrops, in drifted sand. 50 ft.



***Cyperus laevigatus* ♣**

An erect herb with creeping rootstock and crowded bright green cylindrical stems 20 cm tall; crowded glumes in single spikes 1 cm long, from near the apex of the stem. Also grows in fresh water, and can attain a height of 2.5 m.

3 km north of Al Lith; in coarse sand of a small inlet inundated at high tide. Sea level.



◆ *Cyperus laevigatus* var. *caespitosus*

An erect herb 12 cm tall with creeping rootstock; flowers in two or three spikes 8 mm long.

12 km north of Al Bahah, Taif-Abha road; in damp sand on the edge of cultivation. 7,000 ft.

◆ *Cyperus niveus*

A herb with grass-like leaves and stems to 30 cm long; white glumes in crowded spikes forming spherical heads 1.5 cm wide.

Jabal Fayfa, 100 km NE of Jizan; on steep rocky scrub-covered hillside. 5,300 ft.



◆ *Cyperus michelianus* ssp. *pygmaeus*

A tufted leafy herb with flower stems to 9 cm long; glumes with curved tips, in spikes to 6 mm long, clustered in almost spherical heads 6 mm wide and subtended by three long bracts.

Wadi Turabah, between the Taif-Al Bahah road and Jabal Ibrahim; in damp sand by the river. 5,500 ft.

◆ *Cyperus obtusiflorus*

An erect herb 8 cm tall; creamy flower spikes 1 cm long, crowded in a spherical head.

12 km north of Al Bahah, Taif-Abha road; among rocks. 7,000 ft.





Cyperus rigidifolius ♣

A grass-like herb with erect stems 25 cm long, three angled in cross section; dark brown flower spikes 8 mm long, in heads, on long stalks.

Wadi Habaqah, 32 km south of Baljurshi, Taif-Abha road; in water at edge of stream. 6,100 ft.



Cyperus schimperianus ♣

A reed with round stems 60 cm long and a few short basal leaves; black flower spikes 1 cm long, in lax heads

Wadi Habaqah, 32 km south of Baljurshi; in damp sand at edge of stream. 6,100 ft.



Cyperus rubicundus ♣

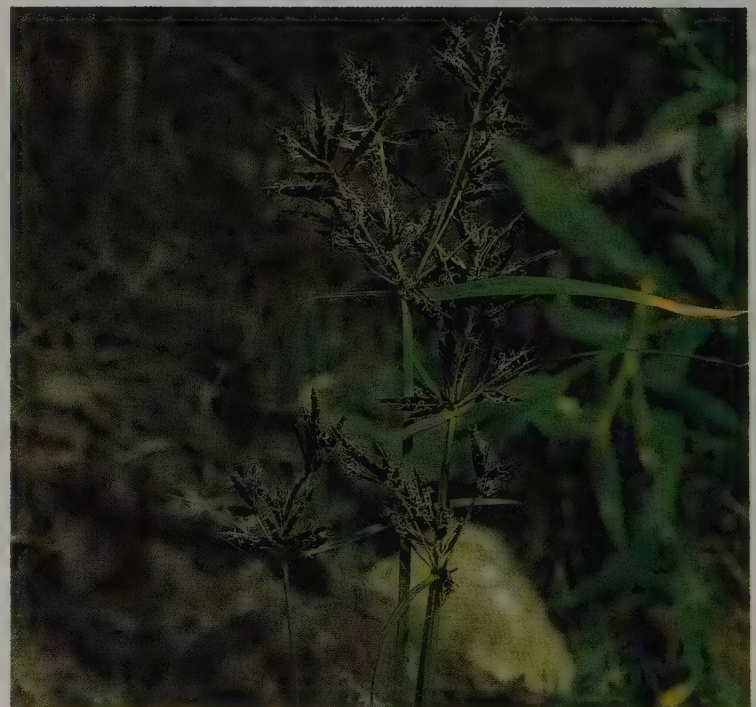
A herb with grass-like leaves and stems to 6 cm tall; chestnut-red glumes in flattened spikes 1.5 cm long, three to five spikes in a head. Fairly widespread in the Asir and southern Hijaz.

Wadi Kharar, near the foot of the escarpment, Jiddah-Taif road; in granite sand. 1,500 ft.

Cyperus rotundus ♦

An erect herb 13 cm tall with a few grass-like leaves and stems triangular in cross section; flowers in crowded spikes 2.5 cm long, subtended by two leaf-like bracts. Widespread and somewhat variable.

At the Taif end of the Makkah By-Pass; in water, a shallow muddy pond among rocky hills. 1,200 ft.





***Cyperus cf. schimperianus* ◆**

A grass-like herb 22 cm tall; blackish flowering heads 1.2 cm long; sour smell.

Below the New Dam, Najran; in a stream bed. 4,500 ft.

***Eleocharis* sp. aff. *atropurpurea* ◆**

A herb growing in tight circular tufts with terete leaves and stems 8 cm long; flowers in solitary oval flower head 4 mm long, at the apex of the stem.

Wadi Habaqah, 32 km south of Baljurshi, Taif-Abha road; in damp sand by stream. 6,100 ft.



***Eleocharis marginulata* ◆**

A herb with terete leaves and creeping stems, the flower stems to 50 cm long; solitary pale brown oval flower head to 2.5 cm long, at the apex of the stem.

Tannumah, 12 km south of An Nimas, Taif-Abha road; in damp sand in the river-bed. 6,500 ft.

***Fimbristylis bisumbellata* ◆**

A tufted leafy herb with flower stems to 15 cm long; flower spikes 7 mm long, on long stalks, in loose erect heads.

Wadi Turabah, between the Taif-Al Bahah road and Jabal Ibrahim; in damp sand under rocks by river-bank. 5,500 ft.





◆ *Fimbristylis sieberiana*

A tufted herb with narrow leaves and reddish flower stems to 35 cm long; oval flower heads 6 mm long, in clusters.

Wadi Habaqah, 32 km south of Baljurshi, Taif-Abha road; in damp sand by stream. 6,100 ft.

◆ *Fuirena pubescens*

A tufted herb with stems 25 cm long and with grass-like leaves; oval flower heads 1 cm long, in clusters of up to five.

Tannumah, 12 km south of An Nimas, Taif-Abha road; in damp sand by stream. 6,500 ft.



◆ *Fimbristylis spathacea*

A tufted herb with narrow basal leaves and flower stem 10 cm long; pale brown flowers clustered in a head 1.2 cm wide, near the apex of the stem.

Jabal Fayfa, 100 km NE of Jizan, on the NW approach road near Suq Ayban; in damp sand in a narrow ravine. 1,500 ft.

◆ *Mariscus schimperi* var. *viridis*

A tufted sprawling herb with grass-like leaves and stems 18 cm long; flower spikes 5 mm long, in crowded heads.

Grandi Lavori road, 25 km from its junction with the Jiddah-Jizan road; among rocks in a narrow ravine. 2,500 ft.



Pycreus sanguinolentus ◆

A tufted leafy herb with triangular stems 25 cm long; blackish flowers in crowded spikes, in a rounded head.

Tannumah, 12 km south of An Nimas; in damp granite sand near stream. 6,500 ft.

Mariscus squarrosus ◆

A tufted herb with grass-like leaves and stems to 4.5 cm tall; glumes with hooked tips in spikes 5 mm long, in spherical heads.

Wadi Kharar, near the foot of the escarpment, Jiddah-Taif road; in damp sand. 1,500 ft.

***Pycreus elegantulus*** ◆

A tufted leafy herb with stems 30 cm tall, triangular in cross section; crowded black flower spikes forming a spherical head 1.5 cm wide.

The waterfall beauty-spot between Abha and Jabal Sawdah; in water at the edge of the stream. 8,500 ft.

***Scirpus brachyceras*** ◆

A leafless reed with cylindrical stems 1 m long filled with white foam; flowers in brown papery glumes in heads 1 cm wide, on stalks from near the apex of the stem.

Tannumah, 12 km south of An Nimas; in damp sand at waters' edge. 6,500 ft.



◆ *Scirpus holoschoenus*

A reed with stems to 1 m long; clustered fruiting bodies in spherical heads 1 cm in diameter. A widespread plant near water.

Edge of the escarpment, 58 km south of Abha; in a small ravine. 7,500 ft.



Scirpus setaceus ◆

A densely tufted herb with slender stems 10 cm long; flowers crowded into fat spikelets 3 mm long.

12 km NW of Abha, on the Jabal Sawdah road; in damp sand by a stream. 8,500 ft.



◆ *Scirpus litoralis*

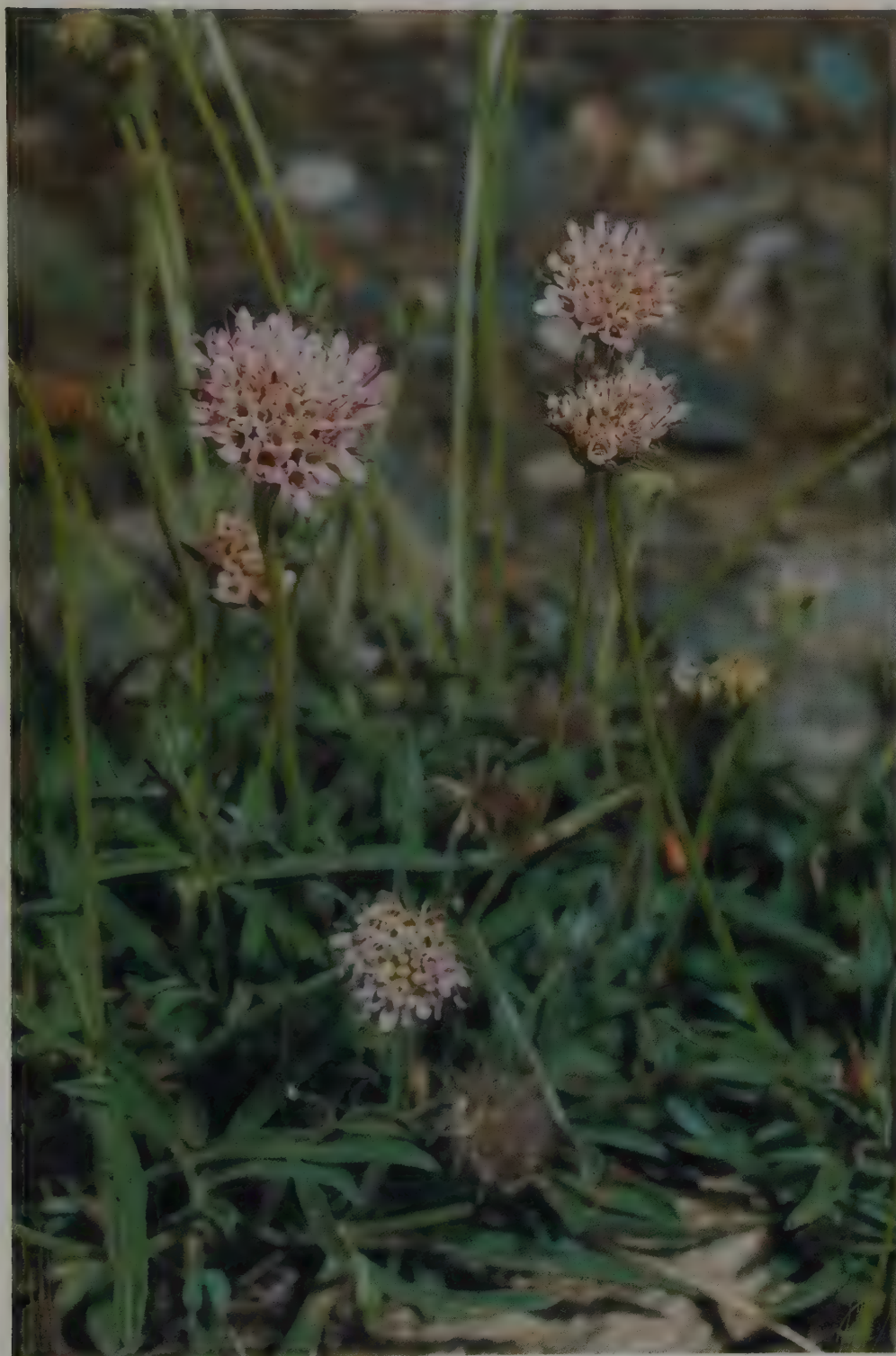
A tufted aquatic herb with large totally submerged leaves and rounded stems to 2 m tall; pale brown flowers in narrow oval spikelets, in drooping branched heads from near the top of the stem, the apex of which is angled.

285 km north of Jiddah, near Jabal Anagayn, off the new Madinah Highway; growing in a clear pool of running water in a palm-filled cleft in a lava flow; 2,000 ft.

DIPSACACEAE

Four species of this family from western Saudi Arabia are herbs with *Pterocephalus pulverulentus* probably perennial under favourable conditions; only one is a shrublet. Because the flowers are borne in a flat head surrounded by a calyx-like involucre of bracts, they bear a superficial resemblance to the

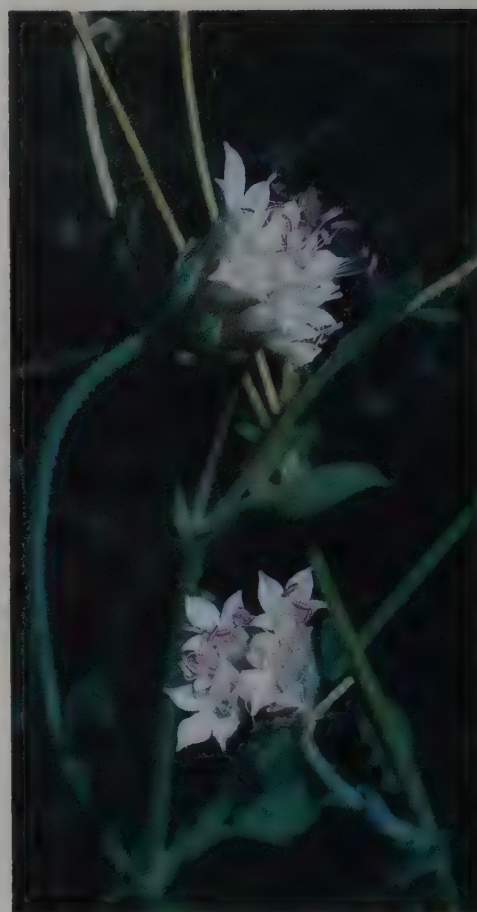
Compositae (Daisy family). In *Scabiosa* species the outer flowers are enlarged and in the two northern species, *S. olivieri* and *S. palaestina*, the fruits develop an umbrella-like extension to the epicalyx and are crowned with spines. These beautiful papery fruiting heads are more noticeable than the flowers.



Pterocephalus pulverulentus ◆

A leafy-based herb with stems to 30 cm long; white flowers with prominent lilac anthers, in flat heads 1.8 cm wide; sweet scent. When grazed, the plant forms a cushion herb.

Near Al Bahah, Taif-Abha road; by the roadside. 7,000 ft.



***Pterocephalus* sp. nov.** ◆

A wide compact very bushy shrublet 60 cm tall; very pale lilac flowers with long lilac anthers, in heads 1.5 cm wide; no scent.

Jabal Radwa, a 7,500 ft. granite massif 70 km north of Yanbu; on a north-facing ravine near the summit, on a rocky ledge. 6,500 ft.

Scabiosa columbaria ◀

A leafy-based herb 3 cm wide with flower stem to 65 cm tall; rosy flowers in flat heads 2 cm wide; no scent. Fairly widespread in the Asir and southern Hijaz.

Tannumah, 12 km south of An Nimas, Taif-Abha road; in damp sand near the river. 6,500 ft.

***Scabiosa olivieri*** ▶▶

A very slender-stemmed branching herb to 45 cm tall; pale lilac flowers in small heads 8 mm wide; attractive circular papery seed heads with groups of fine stiff hairs. Fairly widespread in the north.

Jabal Tamiyah, SW of Uqlat as Suqur, off the Madinah-Qassim road; in a crevice on the flat sandstone summit. 4,450 ft.

Scabiosa palaestina ▶

A delicate erect sparsely branching herb 25 cm high; white flowers in heads 2.5 cm wide; no scent; beautiful papery spherical seed heads. Locally fairly widespread.

21 km north of Qiba and 180 km north of Buraydah; in a shallow wadi near a low limestone escarpment. 1,500 ft.



EBENACEAE

The genus *Euclea* is principally confined to eastern and southern Africa and there are only two representatives of this family in Saudi Arabia, though *Monothecha buxifolia* (Sapotaceae)

is fairly closely related. *E. schimperi* occurs sporadically throughout the high southern mountains and on Jabal Radwa, but *Diospyros* has so far been found only on Jabal Fayfa.



◆ ***Diospyros mespiliformis*** ◆

A wide-crowned leafy tree 5 m tall with simple dark green leaves; in bud.

Jabal Fayfa, 100 km NE of Jizan; on rather barren hillside among *Acacia seyal*. 5,000 ft.



Euclea schimperi ◆◆◆

A leafy tree 5 m tall with wavy-edged leaves; pendent, creamy, bell-shaped flowers 5 mm wide, in racemes; spicy scent. Male and female flowers are each distinctively shaped and grow on different trees. The round fruits are purplish when ripe.

male flowers

Red granite mountain 45 km south of Baljurshi, Taif-Abha road; on a rocky, wooded hillside. 6,500 ft.



female flowers

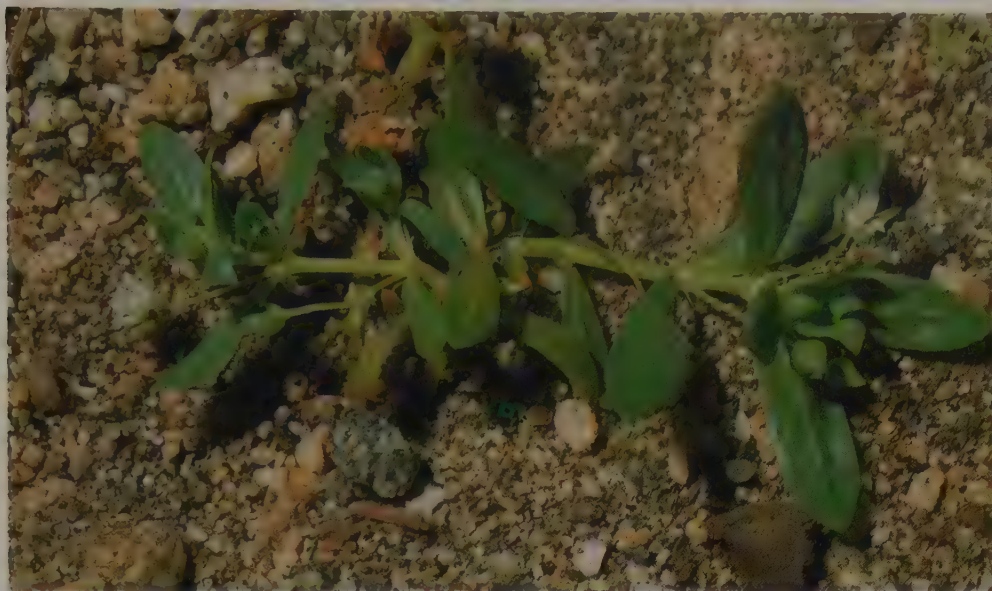
fruits



ELATINACEAE

Though cosmopolitan this family is a small one consisting of only two genera and one, *Bergia*, is frequently found as a weed in damp places such as rice-fields. *B. polyantha* was a very unexpected discovery; the farthest north that the species had

previously been collected is Zambia and Mozambique. The author has also found the plant in Wadi Al Lith. *B. suffruticosa* occurs in the Nile valley near Sudan.



Bergia polyantha ◆◆

A very leafy prostrate herb with radiating stems 3 cm long; white flowers 4 mm wide; dark pink spherical fruits 3 mm in diameter, enclosed in five narrow green sepals.

Wadi Kharar, a granite ravine near the foot of the escarpment, Jiddah-Taif road; in damp sand by a small pool of water. 1,500 ft.



Bergia suffruticosa ◆

A grazed very woody-based herb with new stems to 35 cm long and with bright green dentate leaves; terminal white flower 5 mm wide with lilac anthers; foliage pleasantly aromatic.

60 km SSE of Jabal Sayid Camp, SE of Madinah; at edge of water filled claypan among recent lava flows. 2,800 ft.



EPHEDRACEAE

Ephedra is a member of the Gnetales, an isolated group of gymnosperms, and all its species are many-branched shrubs. There are several fairly distinct species in Arabia, but the family is a difficult one to classify and the specific names suggested are therefore tentative. The plants are green-stemmed and appear

leafless having leaves reduced to small scales or sheaths. Being frequently browsed their true height is difficult to assess. The species are all unisexual with male and female flowers on different plants.



***Ephedra alata* ♀♂**

A stout-stemmed bushy shrub 1 m high (grazed); female 'cones' 1 cm long by 9 mm wide, composed of clustered yellow bracts; male 'cones' 1 cm by 5 mm.

Near Zabirah, 200 km north of Buraydah; in a sandy wadi near a limestone escarpment. 1,800 ft.



***Ephedra* sp. aff. *alata* ♀**

A green-stemmed bushy shrub 1 m high, grazed; yellow 'cones' 6 mm long.

A spur on Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; on a rocky hillside. 5,500 ft.





***Ephedra* sp. aff. *foliata* 2443** ◆◆

An erect dense twiggy leafless shrub just over 1 m high. Not grazed here; female fruits reddish with twin black seeds; male 'cones' 5 mm long.

Jabal Tamiyah, SW of Uqlat as Suqur, off the Madinah-Qassim road; in a crevice of the flat sandstone summit. 4,450 ft.



***Ephedra* sp. aff. *foliata* 1410** ◆

A dense weak-stemmed twiggy shrub; tiny greenish 'cones' 5 mm long. This shrub often grows hanging down cliffs.

100 km south of Taif, Abha road; scrambling over a 7-m-high *Ziziphus* tree. 5,500 ft.





Ephedra intermedia ◆

A dense stiffly erect bush 1.5 m tall; squat yellow 'cones' 5 mm long.
Near the waterfall beauty-spot, Abha-Jabal Sawdah road; on the summit of a rocky hill. 8,500 ft.



***Ephedra* sp. 1491** ◆

A densely tangled vine with thick stems; female inflorescences in large clusters at intervals around the stem.

Jabal Manfah, 50 km NNW of Najran; climbing over a 3 m-high acacia on a wide sandy plain. 6,200 ft.



Ephedra transitoria ◆◆

A densely twiggy grazed shrublet 50 cm high, with creeping suckering stems; pale brown male 'cones' 3 mm long; bright green female ones.

Turayf Camp (31° 40' N, 39° 29' E); in sandy runnel over limestone plateau. 2,900 ft.



EQUISETACEAE

This family is related to the ferns and the only species found by the author in Saudi Arabia, *Equisetum ramosissimum*, is a swamp plant, with roots, jointed stems and whorled leaves.

Reproduction is from spores, which are borne in terminal cone-like heads. Many fossil equisetoids were large trees, but all present-day living ones are small and herbaceous.



◆ ***Equisetum ramosissimum***

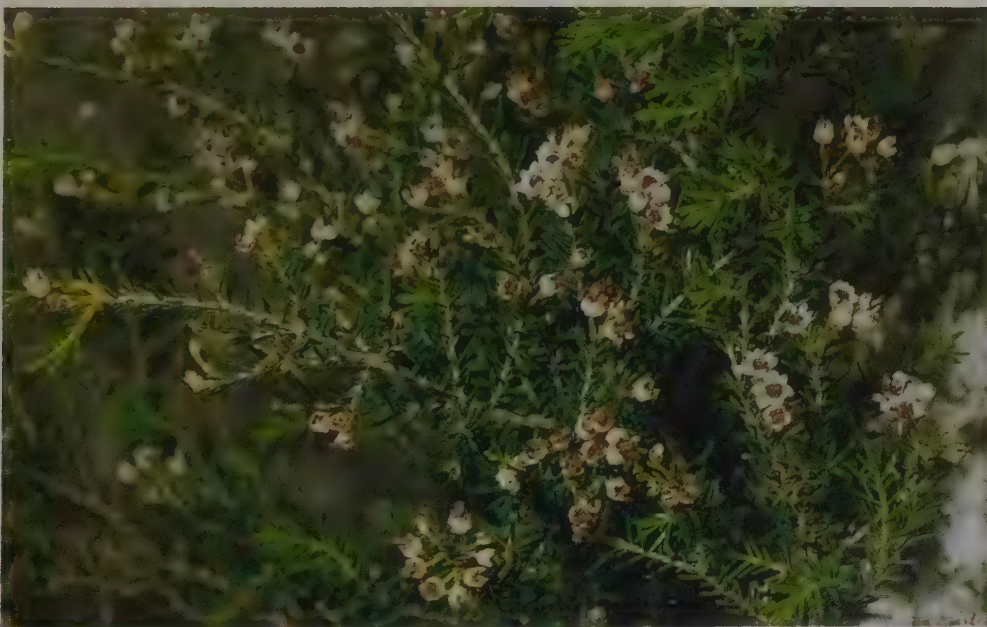
A leafless herb with stems 50 cm tall; brownish fruiting body 2 cm long, at the apex of the stem.

Tannumah, 12 km south of An Nimas, Taif-Abha road; at edge of stream. 6,500 ft.

ERICACEAE

This family is distributed worldwide, having a large number of species, but only one occurs in Saudi Arabia; the common Mediterranean *Erica arborea*. The specimen photographed and described was not growing in a favourable habitat, though several plants were found, and because of environment and

mutilation, it was a relatively small shrub. On the lip of the escarpment on Jabal Sawdah, 9,200 ft., there are several substantial trees which, in spite of lopping, are more than 5 m tall.



◆ ***Erica arborea***

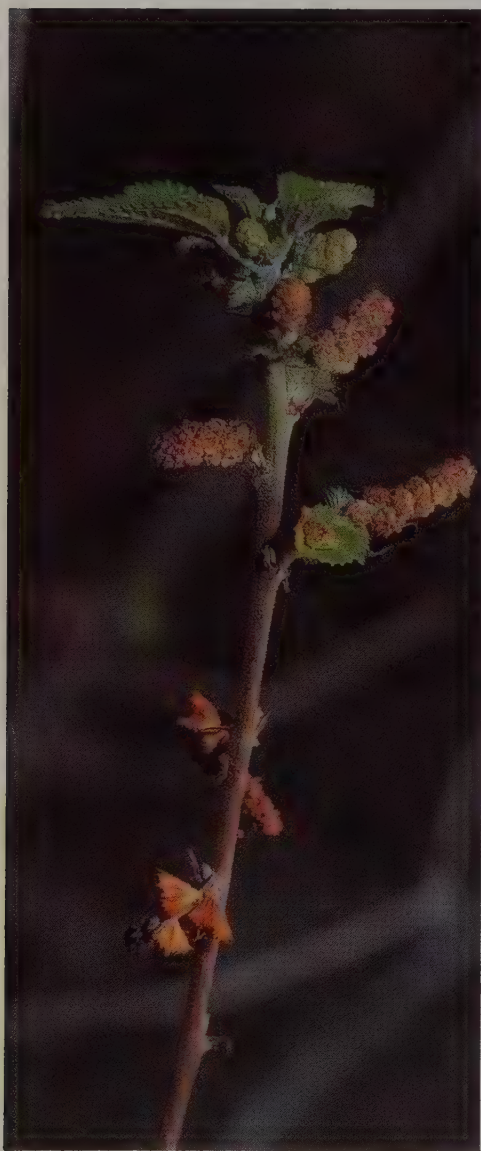
A densely bushy small-leaved shrub 1 m high; white flowers 2 mm wide; no scent.

Tannumah, 12 km south of An Nimas, Taif-Abha road; near the river. 6,500 ft.

EUPHORBIACEAE

In Saudi Arabia this family has species of very diverse appearance; there are trees, shrubs, herbs, vines, and many spiny cactus-like succulents, some growing as tall as trees. All the species belonging to the genus *Euphorbia* have a white milky sap or latex, which can be very poisonous and can cause temporary blindness if it gets into the eyes. *E. arabica* and *Phyllanthus maderaspatensis* are two small herbs of very similar appearance in the field, but a sure way to differentiate between them is to break the stem; the *Phyllanthus* has no milky juice.

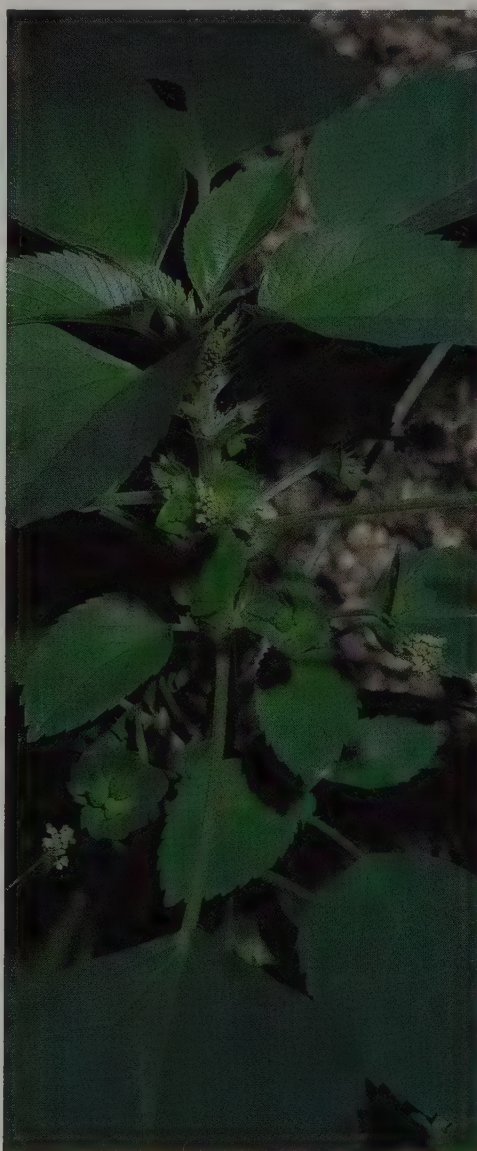
Most of the species, including all the succulents, are found south of Madinah; only *Andrachne*, *Chrozophora*, *Mercurialis* and a few of the small herbaceous *Euphorbia* are found in the north. Glands are a noteworthy feature of many of the Euphorbiaceae. In the genus *Euphorbia* the close aggregation of the simple flowers in conjunction with glands with petaloid appendages produce an effect of a flower, as do the florets in the capitulum of the Compositae.



Acalypha fruticosa ◆

A sprawling slender-stemmed leafy shrub; male and female flowers separate but on the same plant; three-segmented fruits cupped in a toothed circular bract; aromatic. Widespread in the southern foothills.

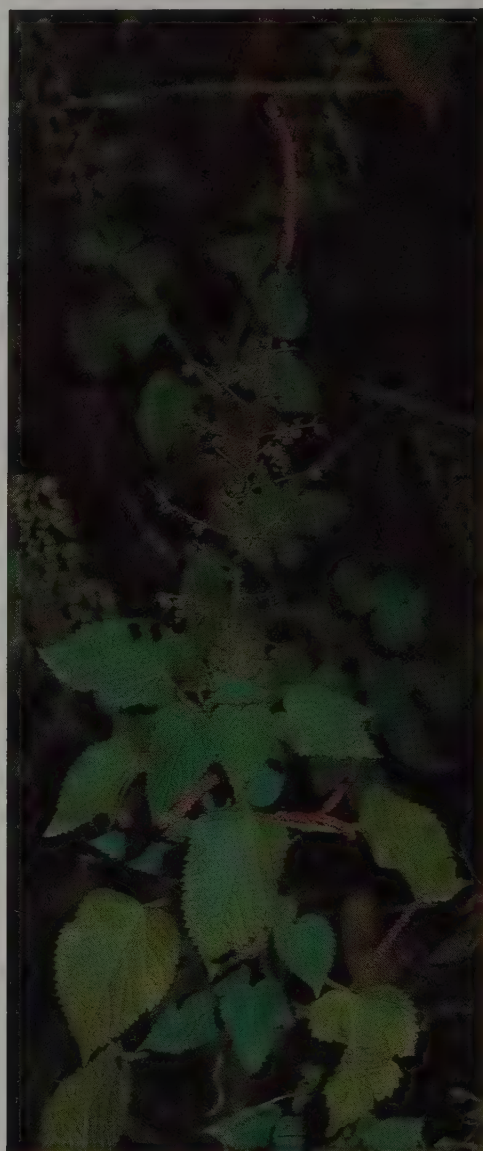
One third of the way up the escarpment, Taif-Jiddah road; in a shallow rocky ravine. 3,500 ft.



Acalypha indica ◆

A very leafy herb to 50 cm high; tiny white flowers 0.5 mm wide, in spikes growing from green cup-like bracts; no scent.

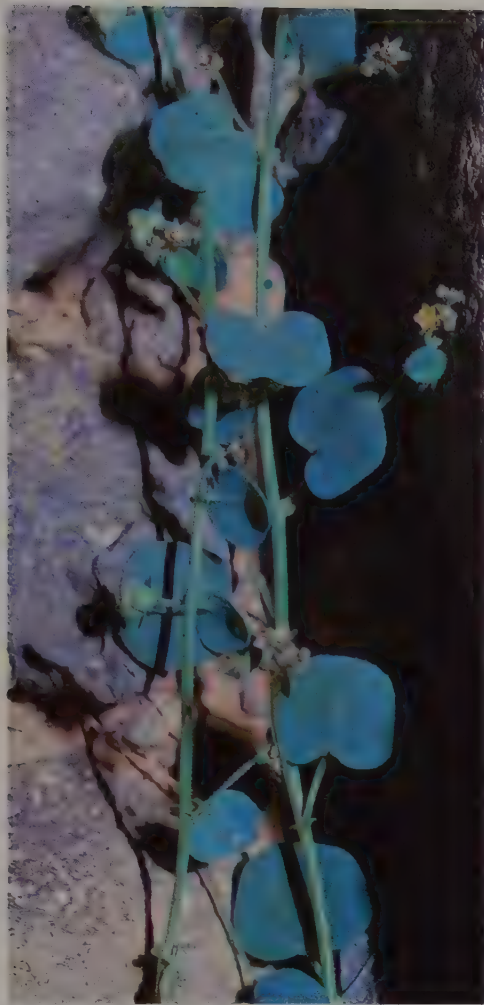
A ravine in granite at the foot of the escarpment, Jiddah-Taif road; in shade. 1,500 ft.



Acalypha racemosa ◆

A leafy bushy herb with slender tapering stems to 30 cm long; red bud-like male flowers in tassels 2.5 cm long; female flowers on a branching terminal spike on the same plant; no scent.

Jabal Fayfa, on the steep SW approach road, 100 km NE of Jizan; in a shady crevice under a huge crag. 4,000 ft.



***Andrachne aspera* var. *glandulosa* ◆**

A many-branched semi-prostrate herb with stems 30 cm long; creamy flowers 1 mm wide; the whole plant very glandular. Widespread.

Near the summit of the escarpment, Jiddah-Taif road; among rocks. 5,000 ft.

◆ ***Andrachne aspera***

A leafy semi-prostrate herb with arching stems to 40 cm long; creamy flowers 2 mm wide. Widespread.

Near the foot of the escarpment, Jiddah-Taif road; in a granite ravine. 1,500 ft.



◆ ***Andrachne telephioides***

A semi-prostrate leafy herb with stems 16 cm long and deep green orbicular leaves; white flowers 2 mm wide, cupped in a flower-like calyx; no milky juice.

Harrat Khaybar Camp (25° 41' N, 39° 57' E) near the airstrip; in shade at edge of lava flow. 5,800 ft.



◆ ***Chrozophora oblongifolia***

A leafy branching herb 50 cm tall; warty three-segmented fruits; tiny yellow flowers 2 mm wide. Very variable. Widespread, especially in the south.

Near low hills, 10 km east of Jiddah; in hard sand. 80 ft.



◆ *Chrozophora tinctoria*

A leafy herb 60 cm high with bluish leaves and all parts very mealy; yellow flowers 3 mm wide. Widespread in the north. This plant yields a blue dye, but the Bedou make no use of it.

Wadi Sawawin iron-ore deposit, 75 km SW from Tabuk; in a rocky ravine. 2,500 ft.



Cluytia myricoides ◆

A woody-stemmed bushy leafy shrublet 1 m tall; male and female flowers on separate plants; both flowers 4 mm wide, creamy with reddish centre; milky sap. Widespread in the Asir and southern Hijaz.

Near Al Hadda, Jiddah-Taif road; in juniper forest. 6,300 ft.



Croton lobatus ◆

A branching herb 70 cm tall with large deeply lobed palmate leaves; tiny flowers on a spike 9 cm long, with male flowers clustered along the apical portion and female flowers below.

Jabal Fayfa, 100 km NE of Jizan; on steep SW approach road, by the roadside. 4,000 ft.



Dalechampia scandens var. *cordofana*

A leafy vine with stems to several metres long and tri-lobed palmately veined leaves, the margin dentate; cyathia cupped in 2 pale green bracts each 1.8 cm long with darker veins and dentate margin; cyathia and glands in groups of three, 8 mm wide; short-hairy fruits cupped in very hairy slender appendages.

◆ 20 km east of Muhayl, new Abha road; twining through bushes on a rocky hillside. 2,500 ft.

Erythrococca abyssinica ◆

A very leafy bushy shrub 75 cm tall; tiny green bud-like flowers 2 mm wide, carried on long tassels from the apical leaf axils; no scent.

Jabal Fayfa, 100 km NE of Jizan; in shady gully near roadside. 5,000 ft.



***Euphorbia ammak* ◆◆**

A dark green bushy many-branched succulent tree 5 m tall with four-angled stems and very small rudimentary spines; pale yellow flowers 6 mm wide; very pale green fruits.

Jabal Fayfa, 100 km NE of Jizan; on the crest of a rocky spur on the southeastern arm, 5,000 ft.



***Euphorbia* sp. aff. *ammak* ◆◆**

A bright green many-branched succulent tree 3 m tall with four-angled stems having stout spines, the spine shields almost linked; yellow flowers 7 mm wide; in fruit; bright scarlet fruits.

Headwaters of Wadi Liyyah, 40 km south of Taif; on a rocky hillside near a farm, 6,000 ft.





Euphorbia arabica ◆

A delicate herb with narrow leaves and stems to 20 cm long; white flowers 2 mm wide; milky juice. It is this latter characteristic that distinguishes this plant from the very similar *Phyllanthus maderaspatensis*.

Near the foot of the escarpment, Jiddah-Taif road; in a granite ravine. 1,500 ft.



Euphorbia balsamifera* ssp. *adenensis ◆

A many-branched white-stemmed leafy succulent bush to 1 m high; greenish yellow flowers 7 mm wide; sour smell. Locally abundant in large colonies south of Abha.

60 km NW of Najran, Abha road; on a stony hillside. 6,200 ft.



Euphorbia cactus ◆◆

A stout erect many-branched spiny succulent shrub to 1.5 m high; yellow cyathia; large fruits along the apical edges of the angled stem; stems constricted at intervals and often with yellow streaks. Very common on Jabal Fayfa.

Jabal Mershid, 40 km east of Qunfudhah; in hard sand. 50 ft.





◆ *Euphorbia* sp. aff. *cactus* ◆

A wide spreading shrub 1 m high with three and four angled spiny stems constricted into pear-shaped segments; greenish cyathia 8 mm wide; sweet scent. Extremely abundant locally.

Jabal Anagayn, 95 km south of Madinah; on a barren rocky hillside. 4,200 ft.

◆ *Euphorbia chamaepeplus* ◆

A leafy herb 7 cm high; reddish horned cyathia 3 mm wide.

30 km north of Shiqri, Tabuk road; in red sandstone. 3,100 ft.





Euphorbia cuneata ◆

A bushy bright brown stemmed shrubby tree 2 m high with slender arching branches; yellow flowers 6 mm wide; sweet scent; milky sap. Rather elongated three-angled fruits. A very widespread plant from the lowlands to 5,000 ft.

10 km south of Jabal Abu Hassan, SE of Abha; on a rocky hillside. 3,000 ft.



◆ ***Euphorbia dracunculoides***

A bushy leafy herb to 25 cm high with narrow glaucous leaves clasping the stem; tiny yellowish flowers 1 mm wide; milky juice.

Near Harrat Khaybar Camp (25° 41' N, 39° 57' E); at edge of lava flow. 5,700 ft.

Euphorbia falcata* var. *falcata ◆

A compact bushy leafy herb 10 cm tall; tiny greenish flowers 1 mm wide, cupped in large leafy bracts. Similar to a small plant of *E. schimperiana* but the glands have no horns.

Near Al Hadda, Jiddah-Taif road; at the edge of cultivation. 6,800 ft.





***Euphorbia fractiflexa* ◆◆**

An erect many-branched spiny succulent 1.7 m high; yellow flowers clustered along the sides of the upper portion of each stem; small fruit. The stems are less stout than *E. cactus*, and are not constricted into segments.

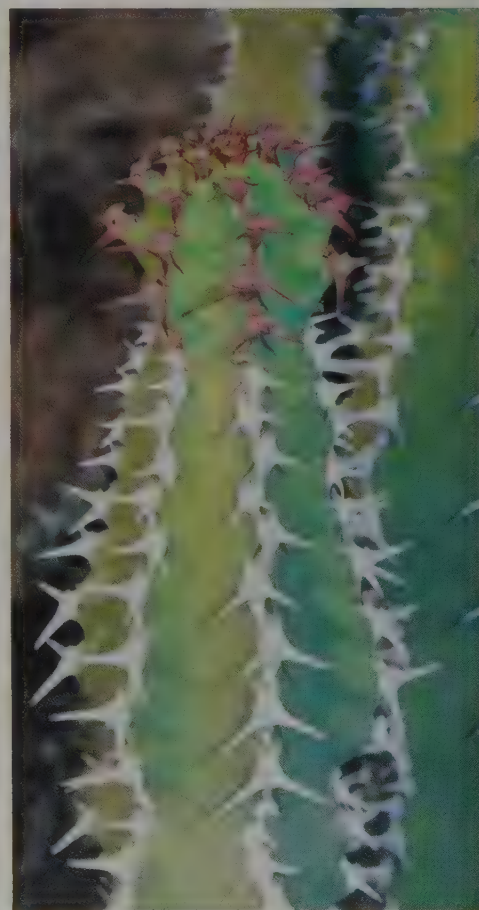
Between Mudhaylif and Muhayl, Jiddah-Jizan road; on a wide sandy plain. 1,200 ft.



***Euphorbia* sp. aff. *fractiflexa* ◆◆**

A stout-stemmed spiny succulent with four or five angled ascending stems to 4 m tall, constricted at intervals with the segments slightly pear shaped; white spines tipped with grey along the undulate margins, the shields sometimes linked with white horn; flowers and fruits not seen.

Farasan Island; widespread in crevices in fossil coral, especially in the north. 40 ft.





Euphorbia glomerifera ◆

An arching sparsely branching herb 22 cm tall with dark green dentate leaves; white flowers 2 mm wide, aging pink; pendent glabrous fruits.

Jiddah; weed in irrigated patch of waste ground bordering small planted garden. 20 ft.



Euphorbia gorinii ◆

A semi-succulent thick-stemmed herb 20 cm high with long narrow greyish leaves; tiny green flowers 2 mm wide. A new record for Saudi Arabia.

40 km east of Qunfudhah; in the shelter of *E. cactus* plants, in hard sand. 50 ft.



Euphorbia granulata ◆

A small prostrate branching softly hairy leafy herb with stems to 4 cm long; white flowers 1 mm wide; milky sap. A very widespread plant in firm sand, such as roadsides.

Low rocky hills, 10 km east of Jiddah; in hard drifted sand. 80 ft.



Euphorbia granulata* var. *glabrata ◆

A semi-prostrate herb with reddish stems to 15 cm long, less hairy than the preceding species; white flowers flushed pink, 1 mm wide.

Low rocky hills, 10 km east of Jiddah; in hard sand. 80 ft.



Euphorbia helioscopia ◆

A leafy herb 20 cm high; yellow round fruits 2 mm wide.

The waterfall beauty-spot on the road to Jabal Sawdah from Abha; by the stream. 8,500 ft.



Euphorbia hirta ◆

A very leafy semi-prostrate herb with stems to 20 cm long; tiny yellowish flowers less than 1 mm wide, in clusters. A weed.

Wadi Fatimah, near Jumum and Makkah; at the edge of an irrigation ditch. 500 ft.



Euphorbia heterophylla ◆

An erect leafy herb 60 cm tall; tiny reddish flowers 3 mm wide; no scent; three-angled fruits.

Najran; a weed on the edge of cultivation. 4,500 ft.



Euphorbia inaequilatera ◆

A prostrate branching herb with reddish stems to 15 cm long; red young fruits 2 mm wide.

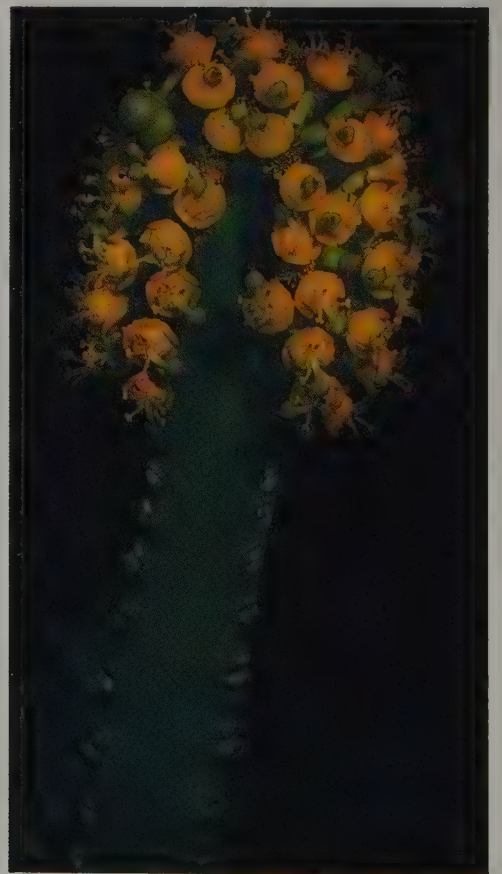
Near Nabhaniyah, 100 km SW of Buraydah; in hard sand. 2,300 ft.



◆ ***Euphorbia inarticulata*** ◆

A many-branched spiny succulent, usually less than 1 m high; yellow flowers clustered near the apex of the stem; small purplish erect fruits. Locally common in the southern lowlands.

12 km SW of Jabal Abu Hassan, SE of Abha; on a rocky hillside. 3,000 ft.



◆ ***Euphorbia* sp. aff. *parciramulosa*** ◆

An arborescent short-spined succulent with a single main stem to 4 m high; long slender unbranched three-angled side stems; deep yellow flowers 5 mm wide, clustered along the upper portion of the stem. Pendent green fruits on elongated pedicel.

At the foot of Jabal Sharda, 390 km south of Jiddah, on the Jizan road; in granite sand. 800 ft.



Euphorbia schimperi ◆

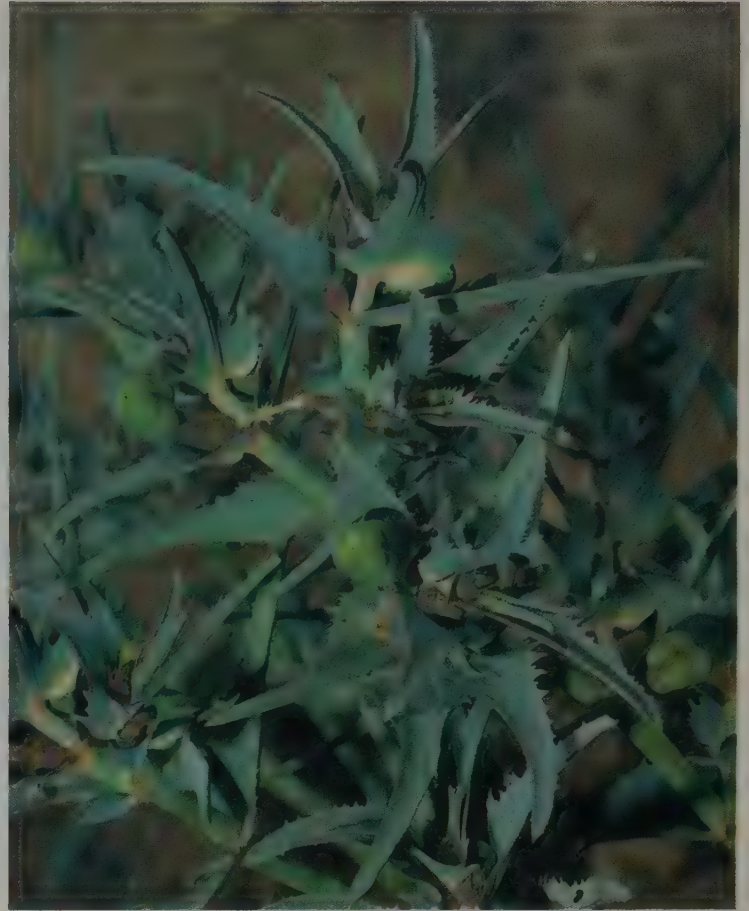
A many-branched bushy succulent shrublet to 60 cm tall with greyish stems; apricot-yellow flowers 6 mm wide; faint sweet scent. Also occurs near Taif.

North of Talha on the Abha-Najran road; on barren rocky hillside, among *E. balsamifera* shrubs. 7,000 ft.

Euphorbia* sp. aff. *schimperi ◆

A branching succulent-stemmed shrub to 1.5 m tall with bright green stems; yellow flowers 1 cm wide with white cottony centre.

Wadi al Uss, on the western slope of Jabal Sawdah; in gravel of an old river bed near the Police Post. 3,200 ft.

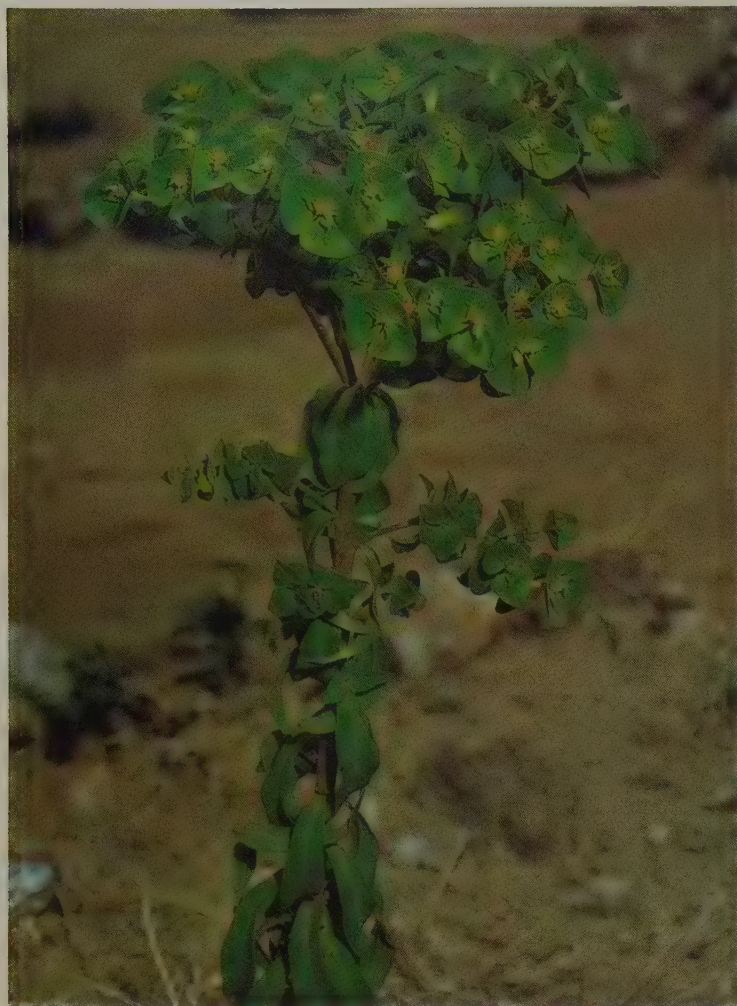


Euphorbia retusa ◆

A bushy leafy herb 30 cm high with blue-green leaves and bracts, the latter toothed, and edged with crimson; tiny greenish flowers; sour smell.

Among red sandstone buttes 20 km north of Shiqri on the road to Tabuk; in hard sand. 3,100 ft.





Euphorbia schimperiana ◆

A bushy leafy herb with reddish stems to 35 cm long and narrow crowded leaves; yellow flowers 6 mm wide, cupped in bracts, from the apex of the main stem; sour smell. The glands have conspicuous horns.

Jabal Sawdah, 28 km NW of Abha; on a rocky hillside. 9,200 ft.



Euphorbia serpens ◆

An erect branching stemmy herb 12 cm tall with small twisted leaves in groups along the stems; white flowers 1 mm wide; milky juice.

Aqiq Airport, inside perimeter fence; in hard sand. 4,800 ft.



◆ ***Euphorbia scordifolia***

A prostrate leafy branching herb with red stems to 15 cm long, leaves toothed, the entire plant downy; pinkish-white flowers 2 mm wide; milky sap. Widespread in the southern lowlands.

Low hills 10 km east of Jiddah; on drifted sand. 80 ft.

◆ ***Euphorbia triaculeata*** ◆

A tangled weak-stemmed very spiny succulent; yellow flowers 4 mm wide. Very common around Jizan; usually under acacia.

Wadi Maraba, at the foot of the escarpment, Abha-Jizan road; under acacias. in a rocky ravine. 2,000 ft.





***Euphorbia* sp. ♦♦**

An erect four and five-angled succulent to 2.5 m tall with unbranched candelabra-like branches carrying rather stout grey and black spines with small shields; flowers and fruits not seen.

60 km north of Shoqaiq-Muhayl junction, Qunfudhah road; in hard sand among lava blocks near sea. 5 ft.



***Jatropha glauca* ♦**

A branching very leafy shrublet 60 cm tall with shiny palmate leaves; pale red flowers 4 mm wide; no scent. Widespread in scattered localities.

80 km SE of Qunfudhah; by a river bank. 300 ft.





Jatropha pelargoniifolia ◆

A thick-stemmed branching shrub to 1 m tall with velvety palmate leaves; pale greenish yellow flowers 6 mm wide; no scent. A widespread lowland plant south of Makkah.

Near Jabal Mershid, 40 km east of Qunfudhah; in hard sand. 50 ft.



Jatropha spinosa ◆

A many-branched leafy woody shrublet 1 m high with small thorns; greenish red flowers 7 mm wide with reflexed petals.

60 km north of Najran, Abha road; on a rocky hillside. 6,200 ft.



Mercurialis annua ◆

A leafy herb 5 cm high; greenish flowers 5 mm wide; sweet scent.

A watered valley in pink granite, Jabal Ash Shati range, west of Tabuk; in damp sand. 4,000 ft.



Phyllanthus maderaspatensis ◆

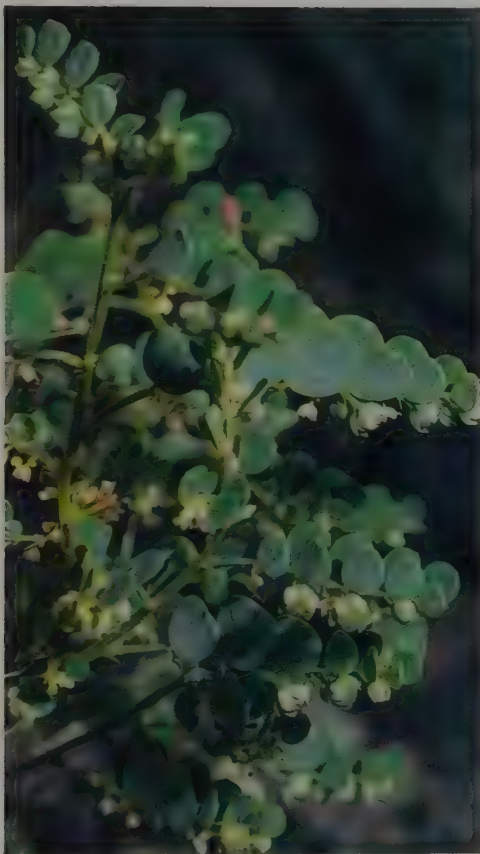
An erect slender-stemmed branching leafy herb to 60 cm high; pale greenish flowers 3 mm wide; no milky sap. This has no milky juice and closely resembles *E. arabica*. A widespread plant in the lowlands.

Jabal Mershid, 40 km east of Qunfudhah; in hard sand. 50 ft.

***Phyllanthus tenellus* var *arabicus* ♦**

An erect bushy leafy herb with bright green oval leaves 6 mm long and many branches; white flowers 1 mm wide, the fruits on long stalks.

Jabal Fayfa, 100 km NE of Jizan, on steep SW approach road; in hard sand by the roadside, at base of cliff. 4,200 ft.

***Phyllanthus rotundifolius* ◆**

An erect branching herb 25 cm high with tiny (5 mm) erect crowded leaves; pendent greenish flowers 1 mm wide. Fairly widespread in the southern foothills.

One third of the way up the escarpment, Jiddah-Taif road; on a rocky hillside. 3,000 ft.

***Ricinus communis* ♦**

An erect branching leafy herb 2 m tall; flowers in spikes, the male in spherical heads 6 mm wide, the female consisting of red stigmas arising from a small cone-shaped body 2 mm wide; sour smell. An introduced weed increasingly widespread especially in the southern mountains.

Tannumah, 12 km south of An Nimas; near the roadside, in a gully. 6,500 ft.





◆ ***Securinega virosa*** ◆

A very bushy leafy shrub 4 m high with slender tangled branches; yellow male flowers 3 mm wide. The tiny greenish female flowers on a separate plant. The fruit is a white berry 4 mm in diameter.

Halfway down the Grandi Lavori Road, 5 km south of Baljurshi; in a narrow wooded ravine. 4,000 ft.



◆ ***Tragia pungens*** ◆

A slender twining herb with nettlelike stinging leaves; pale yellow flowers 2 mm wide; large spherical fruits enclosed in white-hairy bracts.

Between Abha and the King's Palace; twining up a bush, among rocks. 7,800 ft.



FRANKENIACEAE

The author has found just one species in Saudi Arabia and that only twice, though the genus *Frankenia*, being halophytic (salt tolerant), should be found in a wide range of maritime or arid saline soils. These gatherings, one from Wadi Bishah, seemed totally out of habitat with no other halophytes nearby. This family of small heath-like shrubs and herbs has strong affinities with the Tamaricaceae.

◆ ***Frankenia pulverulenta***

A branching prostrate herb with stems to 30 cm long and tiny leaves; papery pink flowers 4 mm wide; no scent.

Just below the New Dam, Najran; in the stream bed. 4,500 ft.

GENTIANACEAE

This family is almost cosmopolitan in distribution but is poorly represented in Arabia with only three genera; one, *Swertia*, is most commonly found in northern temperate regions but in Saudi Arabia occurs commonly in the high Asir, usually near water.

Centaurium pulchellum ♦

An erect leafy herb 11 cm high; bright pink flowers 8 mm wide; no scent.

One third of the way up the escarpment, Jiddah-Taif road; in damp sand. 3,500 ft.



Enicostemma axillare ♦

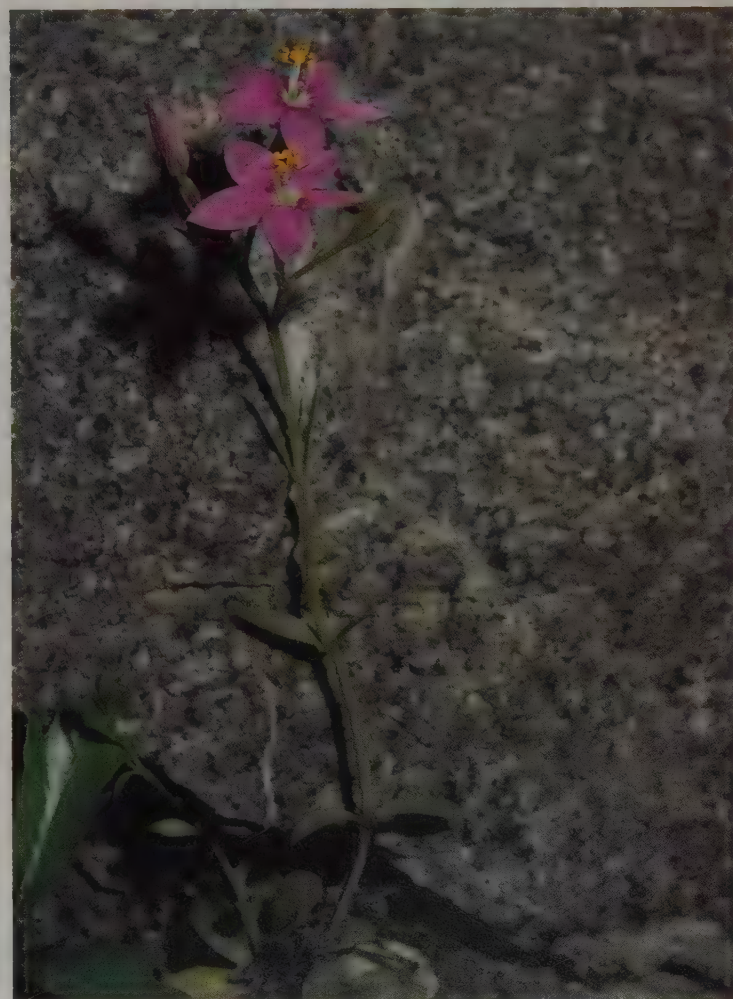
An erect very leafy single-stemmed herb 5 cm tall; white flowers 6 mm wide, in the leaf axils; no scent.

Jabal Fayfa, 100 km NE of Jizan; on an earthen bank by the roadside. 5,500 ft.

***Centaurium* sp.** ♦

An erect branching herb to 35 cm high; large bright pink flowers 1.5 cm wide.

Near a red granite mountain 50 km south of Baljurshi, Taif-Abha road; in a damp crevice on a cliff-like road-cutting. 6,500 ft.





◆ ***Sabaea* sp.**

A tufted herb with fairly wide twisted opposite leaves and squared stems to 10 cm long; bright yellow flowers 5 mm wide cupped in a narrow angled calyx 5 mm long; no scent.

Dalaghan National Park 35 km SE of Abha; in damp sand by stream. 6,800 ft.

◆ ***Swertia* sp. aff. *polynectaria***

A leafy herb with stems to 20 cm long; white flowers 1.5 cm wide with a red-brown stripe on the outside of the petals; no scent. In scattered localities in the Asir.

Jabal Sawdah, 28 km NW of Abha; by a stream. 9,000 ft.



GERANIACEAE

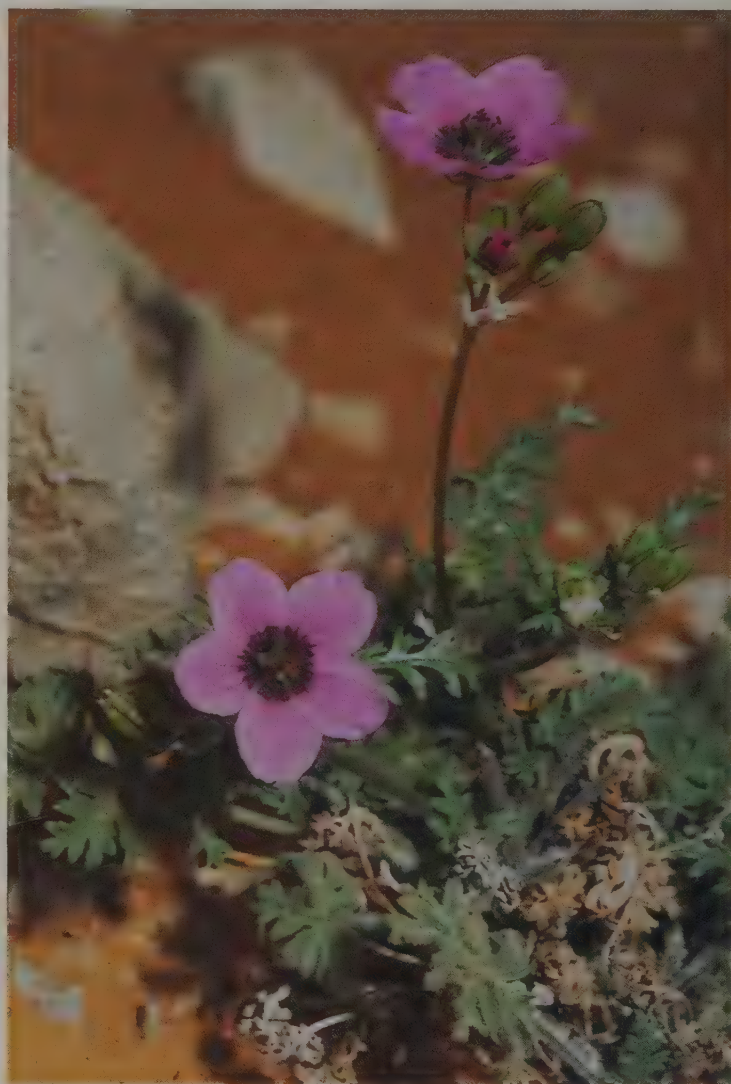
The Geraniaceae is a family fairly well distributed mainly in the temperate regions of the world but it has only eleven genera, of which four occur in Saudi Arabia. The most widespread is *Erodium*, with most of the species being found in the north; this genus together with *Geranium* are often called by the common name of storksbill or cranesbill, referring to the long narrow beak-like fruits. Many species of *Erodium* have very similar

flowers and the best field guide to identification is the shape of the leaf. Only one species of *Pelargonium* has been found so far, from the south; this genus is often wrongly called *Geranium* especially when referring to the showy pink and scarlet hybrids of various mainly South African *Pelargonium* species which are widely used as garden plants.

◆ ***Erodium ciconium***

A very leafy herb with thick ascending stems 20 cm long and deeply dissected leaves; bright lilac-blue flowers 1.5 cm wide, in a head.

8 km NW of Turayf Camp (31° 40'N, 39° 29'E); among crevices of a limestone cairn on the plateau. 2,900 ft.



◆ ***Erodium crassifolium***

A silvery-leaved downy plant with stems to 15 cm long; rose-pink flowers 1.7 cm wide with crimson centre; no scent.

On a spur of Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; on a stony hillside. 5,500 ft.



◆ ***Erodium cicutarium***

A leafy herb 5 cm tall with carrot-like leaves; magenta flowers 6 mm wide; no scent. Fairly widespread especially in the mountains.

5 km SW of Al Hadda, off the Jiddah-Taif road; on a rocky hillside. 6,500 ft.



Erodium deserti ◆

A semi-prostrate herb with stems to 30 cm long and very divided leaves; magenta flowers 9 mm wide, in tight clusters at the apex of the stem, two or three open at a time; no scent.

Near Zabirah, 200 km north of Buraydah; in hard sand. 1,800 ft.



Erodium laciniatum* var. *glanduloso-pilosum ◆

A leafy-based herb 5 cm tall; rosy flower 6 mm wide.

A spur on Jabal Dabbagh, a 7,500 ft. granite mountain 88 km SW of Tabuk; in damp sand. 5,500 ft.



Erodium moschatum ◆

A leafy herb with stems 15 cm long and dentate lobed leaves; rosy-lilac flowers 6 mm wide.

Jabal Ibrahim, between Taif and Al Bahah; in crevice of huge granite boulder on lower slopes. 7,000 ft.

◆ ***Erodium glaucophyllum***

A rather thick leaved herb with stems 10 cm long, the leaves having a reddish margin; not wide opening deep magenta flowers 1 cm wide.

Near Zabirah, 200 km north of Buraydah; in crevice of limestone scarp. 2,000 ft.



Erodium neuradifolium ♀

A branching leafy herb 30 cm tall; rosy-lilac flowers 5 mm wide. Fairly widespread especially in the southern mountains.

Near Al Hadda, Jiddah-Taif road; near the lip of scarp. 6,500 ft.

Erodium pulverulentum ♀

A slender-stemmed branching herb 55 cm tall; rosy flowers 1 cm wide; no scent.

Nabhanivah, 100 km SW of Buraydah; at the edge of cultivated ground. 2,300 ft.



Erodium oxorrhynchum ♀

A leafy herb 15 cm high; narrow-petalled lilac flowers 5 mm wide; no scent.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; in hard sand. 2,000 ft.

Geranium arabicum ♀

A slender weak-stemmed herb with stems to 45 cm long; lilac flowers 1.3 cm wide.

Tannumah, a watered valley 12 km south of An Nimas, Taif-Abha road; near the stream. 6,500 ft.





Geranium mascatense ◆

A leafy tufted herb stems 4 cm long; in bud and fruit, the black centered magenta flowers not seen; black seeds, deeply ridged and pitted.

Jabal Dabbagh, a 7,500 ft granite massive 88 km SW of Tabuk; valley on southern side, in hard sand near pools. 2,800 ft.



Geranium ocellatum ◆

A leafy herb 30 cm tall; deep magenta flowers 1.5 cm wide with a dark purple centre; no scent. Very similar to *G. mascatense*. Black seeds with shallow ridges. Widespread in the Asir and southern Hijaz.

One third of the way up the escarpment, Jiddah-Taif road; in damp sand. 3,500 ft.



Geranium molle ◆

A densely leafy branching herb 15 cm tall; pink flowers 5 mm wide with darker striped deeply lobed petals; no scent. Fairly widespread in the southern mountains.

Jabal Sawdah, 28 km NW of Abha; near the lip of the escarpment. 9,000 ft.



Geranium rotundifolium ◆

A leafy herb with short flower stem 3 cm long and leaf stalks to 6 cm long, the round leaves covering the flowers; tiny magenta flowers 4 mm wide. Locally widespread, and occasionally in the southern mountains.

A spur on Jabal Dabbagh, 88 km SW of Tabuk; in the shade of large granite rocks. 5,500 ft.



Geranium trilophum ◆◆

A branching leafy herb 15 cm tall; deep magenta flowers 1.5 cm wide with a dark purple centre. Distinctive orange fruits with incurving toothed wings.

Tannumah, a watered valley 12 km south of An Nimas; in damp sand near the river. 6,500 ft.



Geranium* sp. aff. *trilophum ◆

A leafy herb 10 cm tall; white flowers with a faint grey centre 1.5 cm wide. Locally widespread.

One third of the way up the escarpment, Jiddah-Taif road; in hard sand in a small shallow wadi. 3,500 ft.

Monsonia heliotropioides ◆

A bushy leafy herb 50 cm tall; in fruit.

The university grounds, Abha; in hard sand. 6,200 ft.



Pelargonium alchemilloides ◆

A leafy herb with ascending stems 40 cm long; white flowers 2 cm wide, in heads. Locally widespread.

Jabal Fayfa, 100 km NE of Jizan; in shade of large rocks on steep hillside. 5,400 ft.

Monsonia nivea ◆

A leafy branching herb with stems to 25 cm tall; almost unlobed leaves with toothed edges; rosy-lilac flowers 7 mm wide; no scent. Fairly widespread.

Jabal Manfah, 50 km NNW of Najran, Abha road; on a stony hillside. 6,200 ft.

***Monsonia senegalensis*** ◆

A grazed hairy leafy shrublet 10 cm tall; lilac flowers 1.5 cm wide; no scent.

17 km NE of Shoqaiq junction on the Ad Darb-Muhayl road; in crevices of a granite pluton. 1,000 ft.

***Pelargonium alchemilloides* ssp. *multibracteatum*** ◆

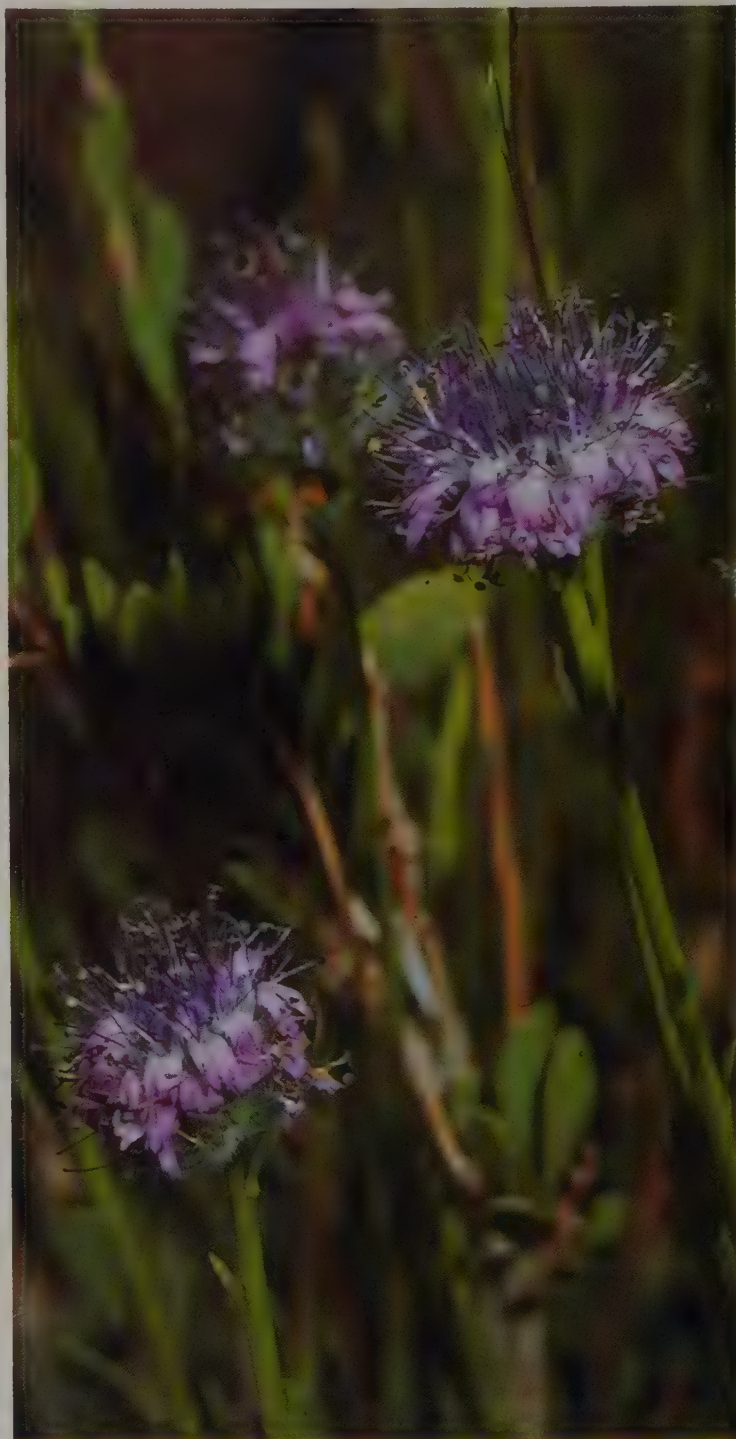
A perennial leafy herb 15 cm tall; white flowers 2.2 cm wide with red stamens; non-aromatic.

15 km SE of Khamis Mushayt; in crevices of a granite outcrop, under an acacia. 6,000 ft.

GLOBULARIACEAE

This is a small family having only two genera worldwide, and they are mainly found in the Mediterranean region. The single species from Saudi Arabia occurs in the north, where it is fairly

widespread in the region south and west of Tabuk. To the layman *Globularia arabica* resembles a shrubby scabious, but the family is most closely related to the Scrophulariaceae.



Globularia arabica ♀♂

A woody shrub 75 cm high; deep lilac-blue scabious-like flowers in an almost spherical head 1.8 cm wide; no scent. Locally fairly widespread.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; on a rocky hillside. 5,500 ft.

HALORAGACEAE

The single species found in Saudi Arabia is an aquatic herb with wholly submerged finely pinnate leaves and only the spikes of flowers projecting above the water. The author has found the plant only once.

Myriophyllum spicatum ◆

An aquatic herb with stems 1 m long and crowded with fine leaves under water; tiny pink flowers with long yellow anthers, on a flower spike 5 cm long projecting above the water; no scent.

Tannumah, 12 km south of An Nimas. Abha road: in a pool in the river-bed. 6,500 ft.

HYDNORACEAE

This family is related to the Balanophoraceae and Rafflesiaceae and all the species are parasites feeding on the roots (or occasionally the stems) of the host plants. *Hydnora johannis* is believed to be parasitic on the roots of *Acacia* and though this was the most likely host of one of the specimens found, in the case of another collection the host plant was impossible to determine. *H. johannis* is leafless and rootless and the solitary bisexual flowers are borne on a thick underground stem and appear only after rains. The plants smell faintly of carrion, which attracts pollinating insects.

Hydnora johannis ◆◆

A stout fleshy pale brown succulent parasite 7 cm tall with four or five rather narrow lobes meeting at the tip and leaving gaping slits at the side; inner surface pale orange with a darker band at soil level; faint musty smell.

Between Sabiya and Idabi on the road to Jabal Fayfa, in a shallow sandy wadi over basalt slabs; in shade, under *Commiphora*, *Grewia*, *Maytenus* and *Cissus rotundifolius*. 500 ft.



HYPERICACEAE

Some authorities regard this family as a sub-family of the Guttiferae, which has five sub-families, each very distinct. All four species of *Hypericum* found by the author have been in the high Asir, and except for the few plants of the rare *H. sp. aff. sinaicum* each is fairly common only within a limited locality. *H. revolutum* has perhaps the widest range, growing along many of

the watercourses of the Jabal Sawdah area, and two of the other species were also found near water. Glandular secretions of essential oils are produced from within the stems, leaves and floral parts, and during the heat of the day the strong spicy odour produced, especially by *H. revolutum*, can be detected from some distance.



Hypericum annulatum ◆

An erect leafy herb branching from the base and with opposite leaves along the stems; yellow flowers 2.2 cm wide; no scent.

Jabal Fayfa, 100 km NE of Jizan; on steep shady bank. 5,300 ft.



Hypericum revolutum ◆

A slender-stemmed shrub to 3 m high growing in dense thickets; bright yellow flowers 6 cm wide; sweet spicy scent.

The waterfall beauty-spot on the road to Jabal Sawdah, NW of Abha; lining the stream-banks. 8,500 ft.



◆ ***Hypericum hircinum***

A bushy leafy shrub to 1.5 m tall; yellow flowers 5 cm wide; faint goat-like scent.

Tannumah, a watered valley 12 km south of An Nimas; in damp sand by the river. 6,500 ft.



***Hypericum* sp. aff. *sinaicum* ♣♦**

A woody-based herb with crowded white-downy leaves along the stems which are 15 cm long; yellow flowers 2.5 cm wide; no scent. This is the only colony found so far, and a new record for Saudi Arabia.

Wadi Mahra, 70 km south of Baljurshi, Taif-Abha road; on a small cliff above the stream. 6,000 ft.



IRIDACEAE

This family is related to the Liliaceae and the Amaryllidaceae and all the species found in Saudi Arabia have relatively large showy flowers. The northern *Gynandiris sisyrinchium* can grow in large colonies, the massed flowers resembling a blue lake when seen from a distance. The other species have, to date, been found mainly in the southern mountains, and though *Romulea*

fischeri is perhaps the most widespread of these, the flowering season is so short the flowers are often overlooked.

The flowers show a wide degree of variability with some extremely modified from the basic shape, though all have six perianth segments; these are arranged regularly in *Gynandiris*, *Iris*, and *Romulea* and irregularly in *Gladiolus* and *Oenostachys*.



***Gladiolus dalenii* ♣♦**

A corm with several long narrow leaves and flower stems to 90 cm tall; bright scarlet nodding flowers 2.5 cm wide with short green recurved lip; no scent. Locally abundant in the juniper zone in the Asir and southern Hijaz.

One third of the way up the escarpment, Taif-Abha road; among rocks. 3,500 ft.





Gynandiris sisyrinchium ◆

A corm with several long narrow leaves; deep lilac-blue flowers 5.5 cm wide with white throat, on stems 8 cm long; no scent. Opens only in sunlight. Locally abundant in the north.

Among red sandstone buttes north of Shiqri, Tabuk road; in hard sand. 3,100 ft.



Iris postii ◆

A bulb usually with four leaves in two ranks, the blade pale green with cream veins and white margin and the flower stem 10 cm tall; creamy flowers 5.5 cm wide, veined and flushed with greyish blue or lilac, with a yellow keel on the falls; sweet scent. Very local, in small scattered groups. A new record for Saudi Arabia.

Turayf Camp, NE of Turayf; in drifted sand over limestone plateau. 2,900 ft.

Iris albicans ◆

A leafy rhizome with flower stems to 45 cm tall; pure white flowers 8 cm wide flushed with greenish-gold in the throat; sweet scent.

20 km south of Baljurshi, Taif-Abha road; on the banks of a stream through wheatfields. 6,500 ft.





Oenostachys abyssinica ◆◆

A corm with a few slender leaves and arching flower stems to 75 cm tall; narrow bright red flowers 3.5 cm long with tiny green curved lip, not unlike a reduced *Gladiolus dalenii*.

Tannumah, 12 km south of An Nimas, Taif-Abha road; among rocks in the juniper zone. 6,500 ft.



Romulea fischeri ◆◆

A corm with several long thin leaves; rosy-lilac flowers 2.5 cm wide with dark purple stripes on the outside of the tepals; no scent. Locally abundant in the southern juniper zone.

Red granite mountain 15 km SW of Al Hadda, Jiddah-Taif road; in damp sand. 7,000 ft.



JUNCACEAE

The plants of this family, similar in appearance to the Cyperaceae, have stems that are normally cylindrical and often hollow, whereas in Cyperaceae the stems are usually solid and

often three-angled in cross-section. *Juncus* is a cosmopolitan genus of herbaceous rushes occurring mainly in damp habitats of cold temperate or montane regions.



Juncus bufonius ◆

A tufted herb with very slender leaves and stems 8 cm tall; scales 6 mm long, flowers in groups of two or three.

Wadi Wejj, 25 km NW of Taif; in damp sand. 6,800 ft.



Juncus punctorius ◆

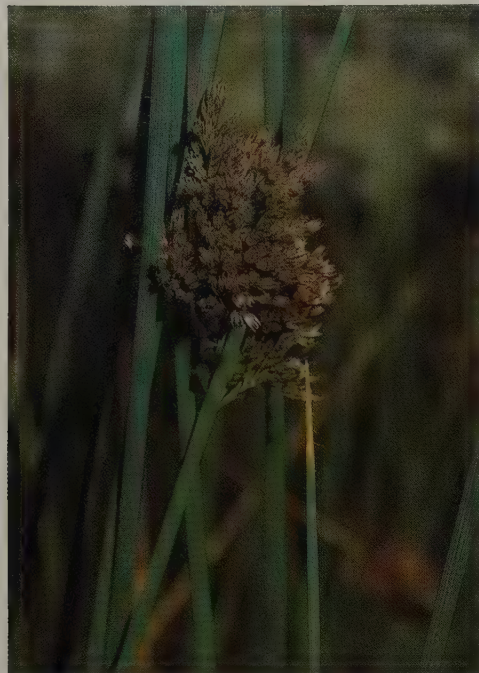
A reed with round stems 1 m tall filled with white foam; flowers with dark brown scales, in lax heads on short stalks; almost spherical fruiting heads 6 mm wide.

The waterfall beauty-spot between Abha and Jabal Sawdah; in water in the stream. 8,500 ft.

◆ ***Juncus fontanesii* ssp. *pyramidata***

A leafy grass-like herb with creeping rootstock and stems 40 cm long; brown fruiting heads 1 cm wide, on long stalks.

The waterfall beauty-spot between Abha and Jabal Sawdah; in water in the stream. 8,500 ft.



◆ *Juncus rigidus*

A reed with hollow circular leaves, often with sharp points, and stems to 1.3 m tall; small greenish flowers in heads 10 cm long.

Najran, on the road to the New Dam; on waste land near the river. 4,500 ft.

LABIATAE

This very large family occurs worldwide and has species that are adapted to almost all habitats and altitudes. The plants, often hairy, are usually square stemmed, and the irregular flowers have lips from which the family gets its name. Usually there is a clear division into an upper and lower lip, with the upper lip often consisting of two lobes and the lower consisting of three; this forms a convenient platform for visiting insects. However, in *Plectranthus* the upper lip is four-lobed and the

large shoe-shaped lower lip is formed from a single lobe; in *Teucrium* the upper lip is entirely absent, leaving the stamens exposed over the five-lobed lower lip.

In Arabia most species are shrubs or herbs and are chiefly perennial; they form the principle browse of sheep and goats, and it is possible that the aromatic oils contained in many species impart the distinctive tangy flavour to local meat.



Ajuga arabica ◆

A spreading bushy herb 12 cm high, the 20 cm long stems often buried in sand and the basal leaves lobed; pale yellow flowers 2 cm long, the two-lobed lower lip with reddish streaks in the centre; no scent. Locally abundant.

Near Radwan, 100 km east of Taif, off the Riyadh road; on sandy plain. 4,500 ft.

Ajuga bracteosa ◆

An erect densely leafy herb 13 cm tall; pale lilac flowers 8 mm wide, in the leaf axils.

The waterfall beauty-spot on the road to Jabal Sawdah, NW of Abha; by the stream. 8,500 ft.





Ajuga chamaepitys* ssp. *tridactylites ◆

A dwarf tufted woody-based herb with stems 4 cm long and crowded lobed hairy leaves; dying fawn flowers 6 mm long; aromatic.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; in rock crevice on NW spur. 5,500 ft.

Ballota undulata ◆

A bushy downy herb with woody base and stems to 45 cm long with rugose orbicular leaves, the margins serrate; in bud, circular flower-like pale green calyces 7 mm wide with the tiny white bud at the base; faintly aromatic. Locally widespread.

Wadi Sawawin Camp, 75 km SW of Tabuk; in crevices of steep rocky hill. 2,500 ft.



***Ballota* sp. nov.** ◆

An erect herb with round woody stems 30 cm tall and with almost orbicular pale green downy foliage; white flowers 1.6 cm long with purple marks on the lip, in whorls along a spike; aromatic. The glandular plants are sometimes non-aromatic.

Jabal Radwa, a 7,500 ft granite massif 70 km north of Yanbu; in shady rock crevices. 6,500 ft.



Becium filamentosum ◆

A leafy herb 25 cm tall; pale lilac flowers 5 mm wide and 1 cm long, with long exserted stamens; non-aromatic. Fairly widespread in the southern foothills.

10 km west of Jabal Abu Hassan, among the foothills SW of Abha; in rock crevices. 3,000 ft.



Becium serpyllifolium ◀

A many-branched slender-stemmed shrublet 70 cm high and 1 m wide with small leaves; deep rosy-lilac flowers 1 cm long; non-aromatic. In scattered localities in the south.

12 km south of Zahran, Abha-Najran road; in shallow ravine among sandstone buttes. 6,500 ft.

Endostemon gracile ▶

A bushy leafy herb 16 cm tall with dentate leaves; deep rosy-lilac flowers 6 mm long; aromatic.

Jabal Fayfa, 100 km NE of Jizan; by the roadside, near the summit. 5,400 ft.



Endostemon tenuiflorus ◀

A grazed leafy woody-based herb 13 cm tall; white flowers 7 mm wide with rosy streaks on the lip; aromatic. Locally widespread.

35 km north of Muhayl on the Jiddah-Jizan road; in hard sand, among acacias. 1,300 ft.

Lallemantia royleana ▶

A small erect herb 5 cm high; pale pinkish flowers 3 mm wide, cupped in a long distinctive calyx; no scent. A new record for Saudi Arabia.

Jabal Dabbagh, a 7,500 ft. granite massif 88 km SW of Tabuk; on a rocky spur. 5,500 ft.



Lavandula atriplicifolia ◆

A bushy woody herb with grey leaves and nodding flowers on stems to 40 cm long; yellow flowers 4 mm wide; aromatic.

Near Bani Rizam 18 km north of Abha on the Taif road; on barren rocky hillside. 7,500 ft.

***Lamium amplexicaule*** ◆

An erect leafy herb 25 cm tall; rosy-purple flowers 1.5 cm long, in whorls; non-aromatic.

The western outskirts of Al Hadda, Jiddah-Taif road; on the edge of cultivation. 6,500 ft.

Lavandula citriodora ◆

A twiggy herb 75 cm high with coarse leaves; pale lilac flowers 4 mm wide with darker veins; pleasantly aromatic, like citronella. Locally abundant.

Near Suq al Ithnayn, 58 km SE of Abha; on a rocky hillside. 7,800 ft.





Lavandula dentata ▲

A bushy leafy shrub to 65 cm tall; pale blue-lilac flowers 4 mm wide, with deep lilac bracts 1 cm long at the apex of the flower spike; very aromatic. Common in the southern mountains and seldom grazed.

Al Hadda, Jiddah-Taif road; near the lip of the escarpment. 6,000 ft.

Lavandula pubescens ◆

A leafy woody herb to 40 cm tall with thickish downy leaves; bright blue flowers 4 mm wide with dark markings in the throat; a strong pleasant aroma. A widespread plant at high altitudes; the leaves are used locally as a substitute for mint in tea.

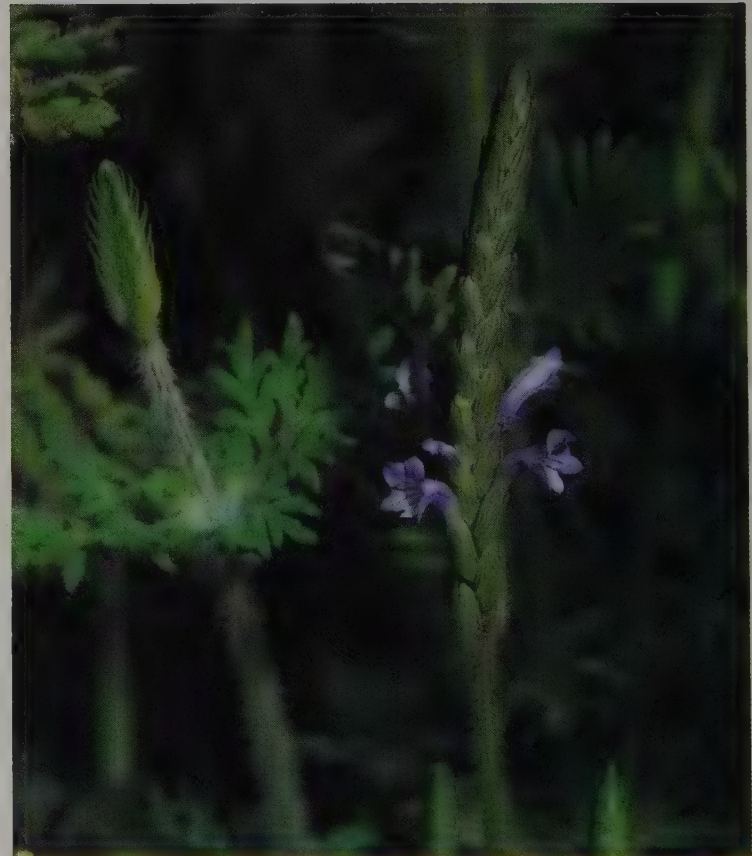
Sayl al Kabir, between Makkah and Taif, eastern road; in hard sand by the roadside. 3,500 ft.

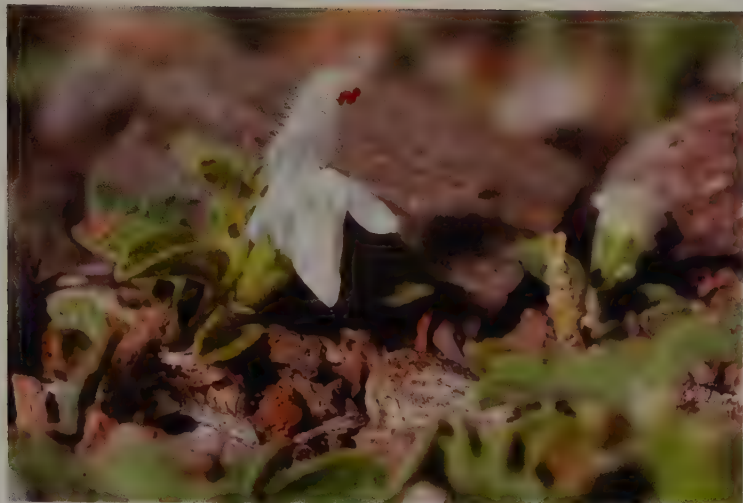


Lavandula stricta ▲

A many-branched woody herb with flower stems to 1 m long; blue or lilac flowers 5 mm wide, in long spikes. A widespread plant and similar to *L. pubescens* but having thinner, more deeply divided leaves and a strong unpleasant musty smell.

One third of the way up the escarpment, Jiddah-Taif road; in a shallow rocky ravine. 3,500 ft.





Leucas alba ◆

A grazed woody herb, cushion-like, 15 cm across; white flowers 7 mm long; aromatic. Non-grazed plants have prostrate or creeping stems.

Near Bani Rizam, 18 km north of Abha, Taif road; on a stony barren hillside. 7,500 ft.



Leucas glabrata ◆

A weak-stemmed leafy herb with stems to 75 cm long; white flowers 1 cm long; aromatic. Fairly widespread in the south.

One third of the way up the escarpment, Jiddah-Taif road; under a bushy acacia. 3,500 ft.



Leucas inflata ◆

A leafy herb to 25 cm high with thick leaves; white flowers 1 cm long, in whorls cupped by leaf-like bracts; inflated velvety calyx; aromatic. Widespread in the south and fairly variable.

Among low rocky hills, 10 km east of Jiddah; in hard drifted sand. 80 ft.



Leucas neuflizeana ◆

An erect leafy herb 8 cm high; white flowers 4 mm long; non-aromatic.

Near the foot of the escarpment, Jiddah-Taif road; under an acacia in a ravine in granite. 1,500 ft.



Leucas urticifolia ◆

An erect leafy herb 35 cm high; white flowers 3 mm wide and 5 mm long, in crowded whorls; non-aromatic.

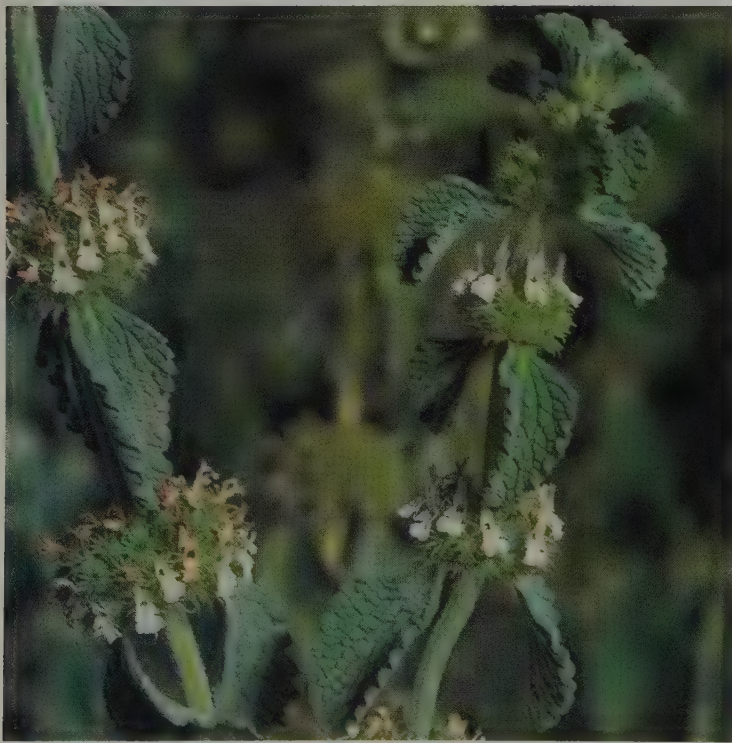
Near the foot of the Grandi Lavori Road, 5 km south of Baljurshi, on a wooded plain; in hard sand, under an acacia. 1,500 ft.



Mentha longifolia* ssp. *schimperi ◆

A woody-based branching herb to 1 m high; lilac flowers 2 mm wide, in spikes; unpleasantly aromatic. Widespread near water, especially in the mountains. Summer flowering.

Wadi Najran; at the edge of a field. 4,500 ft.



Marrubium vulgare ◆

A branching leafy herb 75 cm high; white flowers 5 mm long, in crowded whorls; non-aromatic. A fairly widespread weed.

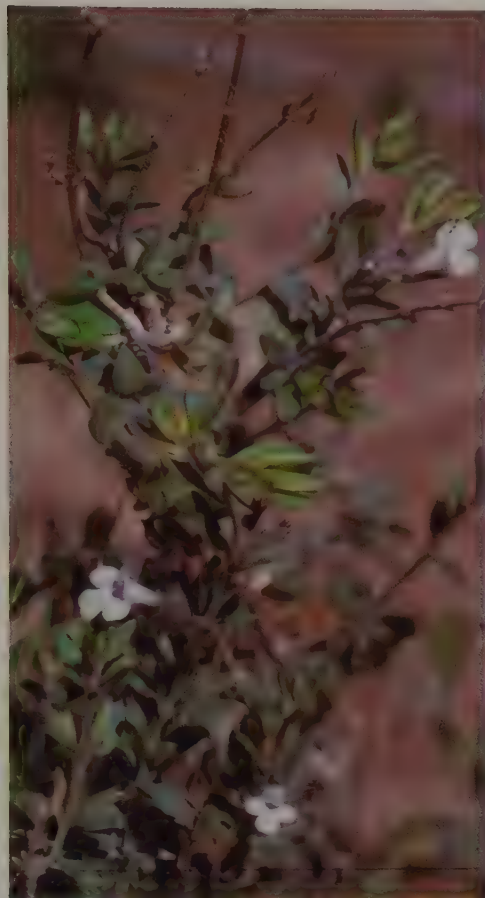
15 km SW of Al Hadda, off the Jiddah-Taif road; by the roadside. 7,000 ft.



Meriandra benghalensis ◆

A twiggly shrub 1.25 m tall; pale lilac flowers 7 mm wide, in whorls; aromatic foliage.

Between Abha and Najran, near Talhah; in a ravine. 6,000 ft.



◆ ***Micromeria biflora***

A bushy woody herb 20 cm high; white flowers 3 mm wide with crimson marks on lip; faintly aromatic. This is a very variable species and many *Micromeria* are lumped together under this name.

Aban al Ahmar, a granite massif 143 km SW of Buraydah; among rocks, on the summit. 4,200 ft.



◆ ***Micromeria biflora* ssp. *arabica*** ◆

A woody-based twiggy herb with stems to 30 cm tall; crowded rosy-lilac flowers 2 mm wide and 8 mm long, including calyx; non-aromatic. Fairly widespread in the Asir.

One third of the way up the escarpment, Jiddah-Taif road; among rocks. 3,500 ft.



◆ ***Micromeria imbricata***

A delicate woody-based herb with stems to 36 cm high; white flowers 3 mm wide; non-aromatic.

Near Suq al Ithnayn, 58 km SE of Abha; among granite boulders. 7,500 ft.

◆ ***Micromeria* sp. nov. 2574** ◆

A tufted leafy slightly downy woody-based herb 12 cm tall; rose-pink flowers 4 mm wide; non-aromatic. Widespread in the southern mountains.

Near lip of scarp, 15 km SW of Al Hadda, Jiddah-Taif road; in a crack of the rocks. 7,000 ft.





***Micromeria* sp. 3247** ◆

An erect soft-hairy leafy herb 20 cm tall branching from near the base; rosy-lilac flowers 3 mm wide with darker spots in the throat; aromatic.

Jabal Fayfa, 100 km NE of Jizan; in a rocky ravine near the base of the mountain. 3,500 ft.



Nepeta deflersiana ◆

A leafy woody-based herb with stems to 45 cm tall; lilac-blue flowers 5 mm wide; aromatic. Widespread especially in the Asir and southern Hijaz.

The lip of the scarp at Al Hadda, Jiddah-Taif road; among rocks. 6,000 ft.



Nepeta sheilae ◆

A leafy herb 25 cm tall; white flowers 6 mm wide, in whorls; very aromatic.

A spur on Jabal Dabbagh, 88 km SW of Tabuk; among granite rocks. 5,500 ft.



Ocimum basilicum ◆

A bushy leafy herb 45 cm high; pale pink flowers 8 mm wide; very aromatic, but different from *O. hadiense*; more like aniseed.

Between Mudhaylif and Muhayhl, Jiddah-Jizan road; in the shade of shrubs on a sandy plain. 1,300 ft.

Origanum syriacum ◆

A bushy leafy shrublet 60 cm tall with small round pale green downy leaves; dead flowers clustered among bracts, in cone-shaped heads 7 mm long; very aromatic.

Jabal Radwa, a 7,500 ft granite massif 70 km north of Yanbu; in a rocky ravine. 4,300 ft.

***Ocimum hadiense*** ◆

A branching woody herb to 75 cm tall; lilac flowers 1.45 cm long; aromatic. Widespread in the southern foothills.

Near the foot of the escarpment, Jiddah-Taif road; in a granite ravine. 1,500 ft.

***Orthosiphon pallidus*** ◆

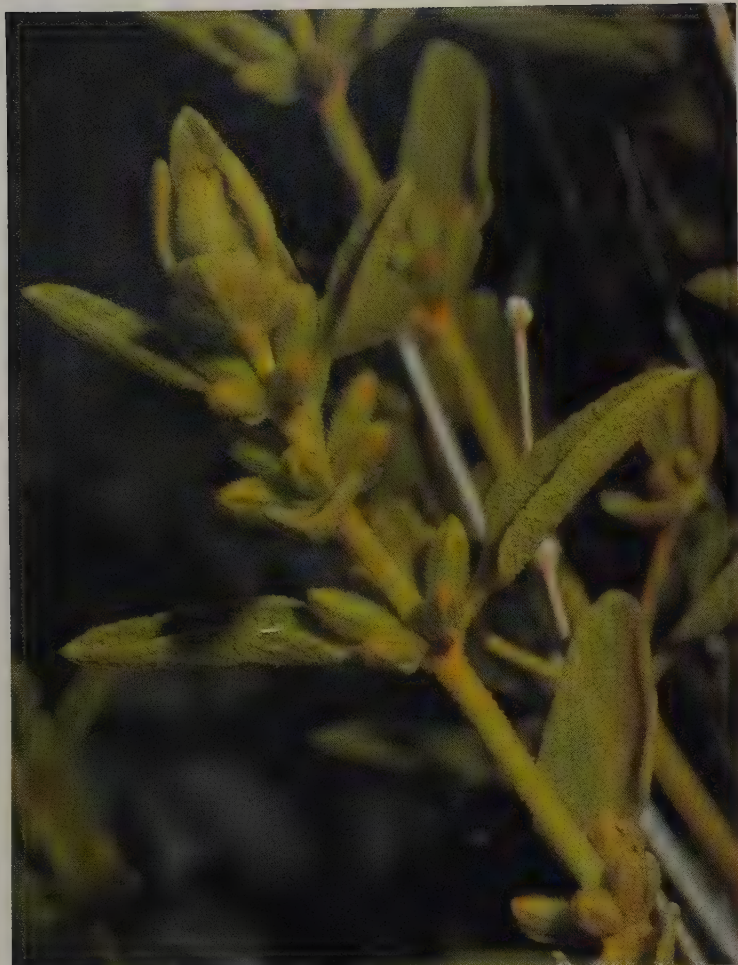
A woody-based herb 25 cm high; tiny white flowers 3 mm long, the calyx enlarging in fruit; non-aromatic. Fairly widespread in the foothills of the Asir and southern Hijaz.

Near the foot of the escarpment, Jiddah-Taif road; in a granite ravine. 1,500 ft.

***Otostegia fruticosa* ssp. *schimperi*** ◆

A straggly shrub 1.25 m high; white flowers 2 cm long, cupped in a large calyx; aromatic. Widespread on rocky hills; the size of the calyx is variable.

One third of the way up the escarpment, Jiddah-Taif road; on a rocky hillside. 3,500 ft.



***Phlomis* sp. nov.** ⬆ ⬇

A densely-branching shrub 1 m high with thick downy rugose leaves that dry a golden colour; in bud, and with dead flowers 3.2 cm long having a lobed lip 1.2 cm wide. Summer flowering.

Jabal Dabbagh, a 7,500 ft. granite massif 88 km SW of Tabuk; on a rocky hillside. 5,500 ft.



Plectranthus arabicus ⬆

A bushy leafy herb with stems to 12 cm long and small fleshy dentate leaves; bright deep blue flowers 6 mm long with white hood; slightly aromatic.

Jabal Fayfa, on the steep SW approach road, 100 km NE of Jizan; in a damp rock crevice. 3,800 ft.



Plectranthus asirensis ⬆

A stout branching shrub to 75 cm tall with large wide downy leaves; deep violet flowers 1.5 cm long, in terminal spikes; very aromatic. Widespread along the escarpment in the southern mountains, the flower spikes sometimes very hairy.

The lip of the scarp, near the King's Palace, south of Abha; among boulders. 8,000 ft.

Plectranthus barbatus ◆

A dwarf woody-based herb 8 cm tall with downy dark green leaves; blue flowers 1.1 cm long with white-hairy lip, in hairy spikes 17 cm long; non-aromatic.

The waterfall beauty-spot between Abha and Jabal Sawdah; among rocks near the stream. 8,500 ft.

Plectranthus* sp. nov. aff. *barbatus ◆

A small-leaved compact woody based shrublet; purple-blue flowers 1.5 cm long, in spikes, on stems 30 cm tall; aromatic. Locally widespread.

Wadi Wejj, 25 km south of Taif; on a rocky hillside. 7,000 ft.

***Plectranthus cylindraceus*** ◆

A bushy herb 35 cm high with aromatic succulent foliage; blue flowers 3 mm long, in spikes, on stems to 1 m tall. Abundant locally.

Wadi al Uss, west of Jabal Sawdah, near the Police Post; among shrubs on a rocky hill. 3,200 ft.



◆ ***Plectranthus marrubioides***

A low branching herb with stems to 30 cm long and extremely brittle succulent dentate leaves; white flowers 5 mm long and 2 mm wide, in whorls densely crowded along a spike; faintly aromatic.

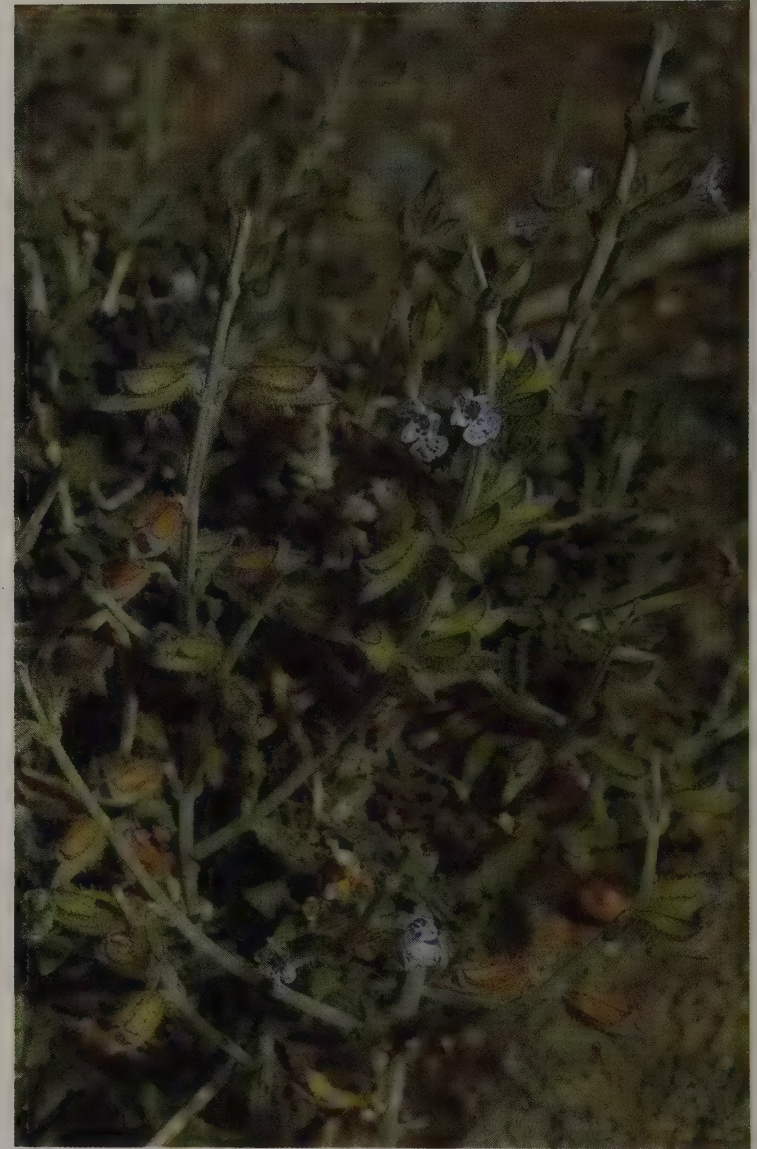
Near the head of the Grandi Lavori road south of Baljurshi ; on vertical granite cliffs, in crevices. 6,000 ft.



◆ ***Salvia aegyptiaca***

A twiggly bushy herb 35 cm tall; pale blue flowers 3 mm wide with darker spots on the lip and throat; non-aromatic. A very widespread plant.

Low rocky hills, 10 km east of Jiddah; in hard sand in a shallow ravine. 80 ft.



◆ ***Plectranthus tenuiflorus***

A downy very leafy herb with ascending stems to 60 cm long; lilac-blue flowers 1.6 cm long with white 'hood', in small erect flower spikes 4 cm high; extremely aromatic.

Wadi al Uss, on the western slope of Jabal Sawdah (NW of Abha); in gravel of old river level, in a wooded ravine. 3,200 ft.



Salvia deserti ◆

A woody-based leafy herb 25 cm high with very rugose leaves; lilac flowers 6 mm long with dark spots in throat, in whorls; white-hairy calyces; faintly aromatic.

Near Nabhaniyah, 100 km SW of Buraydah; in hard sand at base of granite outcrop. 2,300 ft.



Salvia merjamie ◆◆

A rosette-leaved herb with usually leafless flower stems to 20 cm tall. Flower colour variable, either blue, purple, dark red, or pink and white; flowers 1.2 cm long including calyx; non-aromatic. Widespread in the southern mountains.

Near the King's Palace, south of Abha; in hard sand. 7,800 ft.



Salvia lanigera ◆

A bushy herb with very deeply divided rugose leaves and very white-hairy calyces; purple flowers 1 cm long; very aromatic.

Wadi Sabha, near Zabirah, 200 km north of Buraydah; in hard sand at the edge of shallow run-off on limestone. 1,800 ft.





Salvia* sp. aff. *merjamie ◆

A very leafy herb, including flower stem to 25 cm tall; pure white flowers 1 cm long with thin blue lines on the lip; faintly aromatic. Locally abundant.

Jabal Sawdah, 25 km NW of Abha; near the lip of the scarp. 9,000 ft.



Salvia spinosa ◆◆

A stout soft-hairy herb with a rosette of large rugose leaves and branching stems to 35 cm high; white flowers 3.1 cm long including stiff slightly spiny calyces; strongly aromatic. Summer flowering.

Near Shiqri, SW of Tabuk; in hard sand. 3,100 ft.



◆ ***Salvia schimperi***

A rosette-leaved herb to 75 cm tall with some leaves on the flower stems; pale blue flowers 3 cm long including calyx; aromatic.

Near the King's Palace, south of Abha; in hard sand, near cultivation. 7,800 ft.





◆ *Salvia* sp. nov.

A tufted perennial herb of many crowns with very fleecy white-hairy leaves; in fruit, the branching fruiting stem 45 cm high; the ribbed hairy calyx 1.4 cm long, pointed and purplish tipped and subtended by two wide often pale purple bracts; faintly aromatic.

Jabal Warjan, 60 km SW of Madinah; near summit of NE facing gully, in granite. 5,800 ft.

◆ *Scutellaria arabica* ◆

A weak-stemmed leafy herb 25 cm high; pale lilac and white flowers 1.5 cm long; no scent.

15 km SW of Al Hadda, off the Taif-Jiddah road, near the lip of the scarp; on a steep rocky hillside. 7,000 ft.



◆ *Scutellaria peregrina* ◆

A branching leafy herb 25 cm high; deep rosy flowers 1.5 cm long and 8 mm wide with white lip; no scent.

Near the waterfall beauty-spot on the Jabal Sawdah road NW of Abha; in a rock crevice near the stream. 8,500 ft.

◆ *Stachys aegyptiaca* ◆

A leafy shrubby herb to 25 cm tall; large rosy-lilac flowers 9 mm wide, in whorls; aromatic. A variable plant.

Jabal Shar, 115 km SW of Tabuk; among granite boulders. 5,000 ft.





◆ *Stachys* sp. aff. *aegyptiaca*

A woody-based herb with leafy stems 30 cm long; rosy-lilac flowers 8 mm wide with darker spots, usually borne singly; aromatic.

A valley among granite hills, east of Ash Sharmah; in damp sand among rocks. 4,000 ft.

◆ *Stachys* sp. nov. aff. *schimperi* ◆

A woody-based bushy leafy herb with crowded grey downy leaves; rosy-lilac flowers 5 mm wide; aromatic. In scattered localities between Jabal Radwa and Jabal Ibrahim.

15 km SW of Al Hadda, off the Jiddah-Taif road; on a rocky hillside. 7,000 ft.



◆ *Teucrium oliverianum*

A leafy bushy woody-based herb with rounded stems to 40 cm tall; deep lilac-blue flowers 2 cm long; sour smell. Abundant in scattered localities in the north.

Near Nabhaniyah, 100 km SW of Buraydah; in hard sand. 2,300 ft.



Teucrium polium ◆

A grey-leaved bushy shrublet 45 cm tall; pale yellow flowers 4 mm wide, in flat heads that elongate with age; aromatic. A widespread and variable plant.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; on a rocky hillside. 2,000 ft.



Teucrium yemense ◆

A crowded leafy mat-forming herb with prostrate stems to 6 cm long; deep crimson flowers 3 mm wide, in terminal spikes; aromatic. Widespread in the southern mountains.

Between Khamis Mushayt and Suq al Ithnayn; in a crevice of a flat granite outcrop. 7,500 ft.



***Teucrium polium* agg. 2390** ◆

A woody-based shrublet 25 cm high having very small dark green leaves with rolled edges; creamy-white flowers 2 mm wide; aromatic. The point farthest south that the author has found any form of *T. polium* is near Jabal Ibrahim. Locally abundant.

15 km SW of Al Hadda, Jiddah-Taif road; among rocks near the lip of the escarpment. 7,000 ft.



***Teucrium* sp. nov.** ◆

A bushy leafy herb 20 cm high with soft aromatic foliage; creamy flowers 7 mm long, in compact heads 1.5 cm wide.

Jabal Radwa, a 7,500 ft granite massif 70 km north of Yanbu; in the shade of large boulders just below a col. 6,500 ft.



◆ *Thuspeinanta persica*

A bushy leafy herb 7 cm tall; dying; pale blue flowers 6 mm long, cupped in a large short-hairy calyx; non-aromatic.

Turayf Camp (31° 39'N, 39° 29'E); in shallow runnel in hard sand on limestone plateau. 2,900 ft.

LAURACEAE

The Lauraceae is a family of mainly trees and shrubs and is best known perhaps for the laurel, widely planted in towns in Europe. The Arabian representative, *Cassytha filiformis*, is a leafless parasitic creeper, and few people would associate it with the European members of the family.



Cassytha filiformis ◆◆

A parasite with long slender tangled orange stems having haustoria at intervals; white flowers 1.5 mm wide, in short spikes; white spherical berries 6 mm wide. This species often kills the many different species of trees and shrubs it parasitises, and it is abundant in

the wadis around Jabal Fayfa. The tangled naked stems could be mistaken for those of *Cuscuta* species.

Near Jabal Fayfa, 100 km NE of Jizan; parasitic on *Salvadora persica*. 1,000 ft.



LEGUMINOSAE

This very large, cosmopolitan, family is well represented in Saudi Arabia vying with the Compositae and Gramineae for the greatest number of species. The family is characterised by the distinctive one chambered fruit, the pod or legume, from which it derives its name. The Leguminosae is divided into three subfamilies, all represented in Saudi Arabia: the Mimosoideae, the Caesalpinoideae and the Papilionoideae. The Mimosoideae includes *Acacia*, *Dichrostachys* and *Prosopis*: the flowers are small with insignificant petals and showy stamens. The Caesalpinoideae includes *Cassia*, *Delonix* and *Tamarindus*: the flowers are usually more or less irregular with the lateral petals (the wings) covering the dorsal petal (the standard) in bud. The Papilionoideae includes all the

remaining genera: the flowers are usually of the familiar pea-like pattern with the dorsal petal (the standard) covering the two lateral petals (the wings) in bud with the two neutral petals fused to form a keel. *Cordia* is in the Papilionoideae but could be mistaken for a member of the Caesalpinoideae because of its almost regular flowers. Not all plants with pod-like fruits are members of the Leguminosae; for example *Maerua crassifolia*, of the Capparaceae, has pod-like fruits constricted between the seeds (as in *Acacia tortilis*) and the flower has five small petals and a tuft of long stamens similar to the flowers of many legumes in the subfamily Mimosoideae. *Rhynchosia* and *Tephrosia* are evening flowering.

Abrus bottae ◆

A grazed twiggy woody leafy shrublet 60 cm high; pale green flowers 1 cm long flushed with lilac; unscented. On Jabal Fayfa the shrubs grow to 2 m tall and the stems are often twining.

Among foothills, 80 km SE of Qunfudhah; on a steep rocky slope. 300 ft.



Acacia abyssinica var. *macroloba* ◆◆

A large single-trunked densely leafy tree 5 m high; pure white flowers in spherical heads 1 cm in diameter; very sweetly scented; long straight pods with rounded tips. A widespread species in the south and somewhat variable. Late spring flowering.

Jiddah-Muhayl-Jizan road, near the junction with the Grandi Lavori road; by the roadside near a village. 1,200 ft.



young fruit ◆



Acacia albida ▲◆

A single trunked tree 5 m tall with wide bushy crown, the large leaves with many leaflets and only the young stems armed with spines; white flowers in cylindrical heads 5 cm long; the fleshy golden-yellow pods slightly twisted.

15 km south of Baljurshi, Taif-Abha road; in rocky ground at edge of juniper forest. 6,500 ft.



Acacia asak ▲

A many-trunked shrubby tree 2.5 m high with hooked thorns; white, cream, or yellow flowers in cylindrical heads 5.5 cm long; sweet scent. Flat purplish-brown pods. Widespread.

Wadi Fatimah, 25 km from Jumum, off the Makkah road; on a low rocky hill side. 600 ft.





Acacia ehrenbergiana ◆

A wide spreading shrub 4 m high with slim brown stems and peeling papery bark; long straight spines, usually in pairs; yellow flowers in spherical heads 1.2 cm in diameter; sweet scent. Very widespread, especially in the lowlands.

Near the foot of the escarpment, Jiddah-Taif road; on a gravelly plain. 1,000 ft.



Acacia etbaica ◆◆

A single-trunked tree with umbrella-shaped crown, slender branches and rough deeply grooved bark; short spines and small hooked thorns; white flowers in spherical heads 7 mm wide; short seed pods 3.5 cm long.

30 km north of Zahran, Abha-Najran road; on sandy bank of shallow wadi. 6,600 ft.



Acacia elatior* ssp. *elatior ◆

A single-trunked leafy tree 7 m high with exceptionally long (6 cm) usually alternate white thorns; white flowers in spherical heads 1 cm in diameter, on long new leafy shoots; sweet scent.

Wadi al Uss, on the western slope of Jabal Sawdah, NW of Abha, 45 km NW of the Police Post; at the edge of a small sandy wadi among the foothills. 1,500 ft.

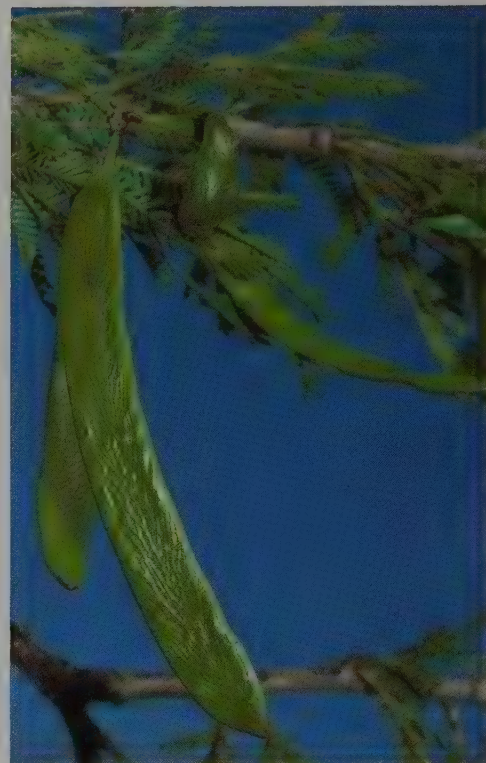




◆ *Acacia etbaica* ssp. *uncinata* ◆

A grazed shrubby tree 4 m high, with short straight thorns; creamy flowers in spherical heads 1 cm in diameter, on long peduncles; sweet scent; very shiny slightly rough pods. Locally widespread.

Between Abha and Talhah on the Najran road; on a low rocky hill by the roadside. 6,500 ft.



◆◆ *Acacia iraquensis* ◆◆

A stout single-trunked tree 5 m high with long paired spines; creamy-yellow flowers in spherical heads 1.5 cm diameter; sweet scent; long curved pods with rounded tips. Widespread and very variable.

Near Jabal Manfah, 60 km NNW of Najran, off the Abha road; among granite boulders near the Police Post. 6,200 ft.





Acacia hamulosa ◆

A bushy slender-stemmed shrub 3 m high; white flowers in cylindrical heads 3 cm long and 1.5 cm wide; sweet scent; pods very wide and slightly twisted. Very widespread; the flowers often appear before the leaves.

Between Zaymah and Jumum on the eastern Makkah-Taif road; on a rocky hillside. 1,000 ft.

Acacia mellifera ◆

A round-crowned single-trunked tree 5 m high with slender branches and small hooked thorns; white flowers flushed pink in short cylindrical heads; sweet scent; short wide pods. Locally widespread.

Between Abu Arish and Al Aridah, near Jizan; in hard sand. 600 ft.



Acacia laeta ◆

A large-crowned leafy tree 7 m tall; white flowers in cylindrical heads 6 cm long, the calyces sometimes pink; sweet scent; wide flat seed pods similar to *A. hamulosa*.

Near Hamdah, north of Khamis Mushayt; in a narrow channel of wide sandy wadi. 4,400 ft.



Acacia negrii ◆

A large-crowned tree 6 m tall with rough bark, long grey spines and some thorns; white flowers in spherical heads 1 cm in diameter; sweet scent; short reddish seed pods.

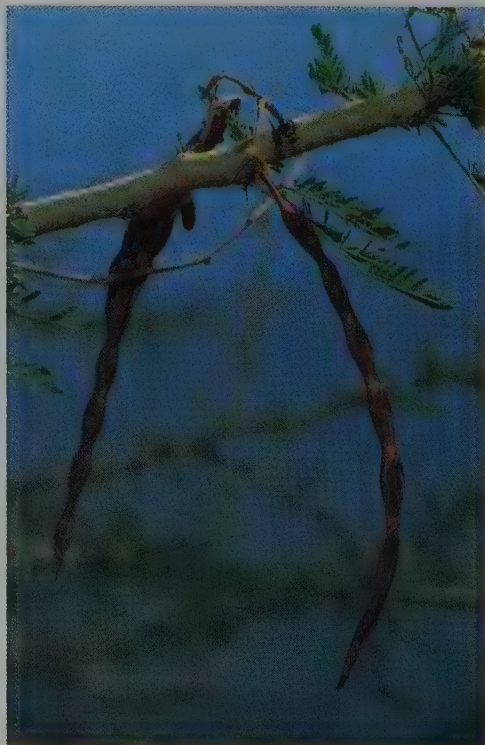
12 km south of Baljurshi, Taif-Abha road; among junipers on low rocky hill. 6,500 ft.



Acacia nubica ◀▶



Acacia seyal; flowers ▶



Acacia seyal; fruits ▶

◆ ***Acacia nubica***

An erect flat-topped bushy shrub to 1.5 m high, branching from the base and with slightly blue-green leaves; white flowers in spherical heads 1 cm in diameter; distinctive medium-sized straight pods, usually in bunches. A wide-spread shrub in restricted localities south of Makkah at all altitudes to 6,200 ft.

Near Jabal Mershid, 40 km east of Qunfudhah; in hard sand. 50 ft.



◆ ***Acacia tortilis* ssp. *raddiana***

A single-trunked leafy tree 10 m tall; the young fruits 8 cm long and very twisted. This species is similar to *A. tortilis* but is autumn flowering and seems more widespread in the region north of Madinah.

Nuqra, between Madinah and Qassim; in the shaft of an old mine. 3,000 ft.



◆ ***Acacia tortilis***

A bushy several-trunked tree 4 m high with both hooked thorns and straight spines; white flowers in spherical heads 7 mm in diameter; sweet scent; slender, very twisted pods. Very widespread especially at low altitudes.

The Makkah By-Pass road, 110 km from Jiddah; on a low rocky hillside. 600 ft.

◆ ***Acacia seyal***

A shrub to 2.5 m tall; yellow flowers in spherical heads 1.6 cm wide, in terminal spikes; strong spicy scent; long narrow pods constricted between the seeds. Distinctive yellowish peeling bark.

Jabal Fayfa, 100 km NE of Jizan; on steep rocky hillside. 5,300 ft.



◆ ***Anagyris foetida***

An erect bushy leafy shrub to 2 m high, flowering on old stems; greenish yellow flowers 3.5 cm long with a brownish blotch on the short standard petal; strong sour smell. This plant is widespread between Taif and Abha along the banks of fields and is never grazed.

Between Jabal Sawdah and the main Taif-Abha road; on a bank near cultivation. 8,500 ft.

◆ ***Alhagi maurorum***

A bushy spiny green-stemmed herb 30 cm tall with a few small simple leaves; in fruit, the pods two to five-seeded, 2.5 cm long, growing from the spines. Locally widespread.

Najran; on waste land near the town centre. 4,300 ft.





◆ ***Argyrolobium arabicum***

A bushy twiggy herb to 20 cm high with small leaves; yellow flowers 8 mm long with the back of the standard petal and the wings flushed with brown; wings nearly always twisted; unscented. A rather variable and widespread species in the Asir and southern Hijaz.

Between Abha and Talhah, on the Najran road; in gravelly sand by the roadside. 6,500 ft.



◆ ***Argyrolobium confertum***

A grazed prostrate leafy herb with radiating stems 5 cm long and silvery leaves; yellow flowers 8 mm long; no scent. Locally abundant.

Jabal Sawdah, 28 km NW of Abha; in sand-pan among junipers near the escarpment. 9,100 ft.



◆ ***Argyrolobium* sp. aff. *arabicum***

A very slender-stemmed narrow-leaved bushy herb 45 cm high; greenish golden flowers 8 mm long with twisted wings; unscented.

One third of the way up the escarpment, Jiddah-Taif road; among rocks in a small ravine. 3,500 ft.





Astragalus abyssinicus* ssp. *abyssinicus ◆

An erect leafy branching herb 1 m tall; narrow rosy-lilac flowers 6 mm long aging blue, in spikes; unscented. A very widespread herb in the southern mountains, especially along road verges.

8 km SW of Al Hadda, near Taif, on the road to the red mountain; among rocks near the road. 6,800 ft.



Astragalus bombycinus ◆

A hairy prostrate herb with radiating stems to 45 cm long; pink flushed flowers 1.5 cm long; stout hairy pods.

Near Nabhaniyah, 100 km SW of Buraydah; in hard sand in a fallow field. 2,300 ft.



Astragalus atropilosus ◆

An erect branching very leafy herb to 1.5 m tall, the leaves with many pinnae; white, lilac flushed flowers 1 cm long, crowded in spikes; no scent.

Jabal Fayfa, 100 km NE of Jizan; by the roadside, in sand, at base of steep rocky hillside. 4,800 ft.

◆ ***Astragalus annularis***

A branching prostrate herb with stems to 13 cm long; pink flowers 5 mm wide; flat-sided curved pods characteristically streaked with red.

Near Zabirah, 200 km north of Buraydah; in drifted sand near a bauxite outcrop. 1,800 ft.



Astragalus caprinus* var. *laniger ▲

A rosette herb with long leaves and small narrow leaflets; centrally clustered bright yellow flowers 3 cm long including the hairy calyx; unscented.

10 km north of Shiqri on the Tabuk road; in drifted red sand. 3,100 ft.

Astragalus corrugatus ▼

A prostrate herb with radiating stems 12 cm long; white flowers 8 mm long; curved seed pods nearly 3 cm long with wrinkled outer margin either side of a deep groove.

Near Hamdah, north of Khamis Mushayt; in hard sand near large wide wadi. 4,400 ft.



Astragalus eremophilus ▲

A prostrate fine-hairy leafy herb with stems 10 cm long; pale yellow flowers 6 mm long; curved hairy pods.

Near Jabal Ibrahim, off the Taif-Al Bahah road; in a sandy wadi among granite hills. 6,800 ft.



Astragalus fatimensis ▲

A leafy branching semi-prostrate herb with stems 40 cm long; crowded lilac flowers 2 mm wide, in heads; unscented. Fairly widespread especially in the mountains.

8 km SW of Al Hadda near Taif, on the road to the red mountain; among rocks by the roadside. 6,800 ft.

Astragalus hauarensis ♦

A leafy semi-prostrate herb with stems to 10 cm long and large coarse leaflets; white flowers 1 cm long with a long slender calyx; single thick curved pods with a groove along one side.

Near Zabirah, 200 km north of Buraydah; in hard sand in a wide scrub-filled wadi. 1,800 ft.

***Astragalus kahiricus*** ♦

A stout erect herb 25 cm high with long blue-green leaves, the leaflets almost orbicular; yellow flowers 1.5 cm long; the reddish hairy calyx inflates to enclose the pod; unscented.

Between Qassim and Riyadh al Khabra on the Madinah road; in hard sand near the road. 2,000 ft.





Astragalus palaestinus ♣

A prostrate leafy herb with stems to 17 cm long; large white flowers 1.4 cm long with pale pink marks on the 'wings'; stout curved pods 1.4 cm long.

Near Zabirah, 200 km north of Buraydah; in a shallow claypan in a wide wadi. 1,800 ft.



Astragalus schimperi ♣

A prostrate leafy herb with stems 15 cm long, and relatively large coarse leaves; white flowers 6 mm long; fairly large slightly hairy pods in groups of three or four. The leaves are sometimes narrow and silvery and the flowers blue.

Near Zabirah, 200 km north of Buraydah; in drifted red sand near a bauxite outcrop. 1,800 ft.



Astragalus sieberi ♣

A bushy leafy woody-based herb with stems 30 cm long; narrow yellow flowers 3 cm long, in groups; unscented. This plant often appears spiny as the old leaf-stalks are persistent. Very widespread especially in the north; slightly variable.

Near Nabhaniyah, 100 km west of Buraydah; in a shallow run-off by a rocky outcrop. 2,300 ft.



Astragalus sparsus ◆

A spreading leafy white-hairy prostrate herb with reddish stems 45 cm long; bright lemon-yellow flowers 3 cm long, in groups; unscented.

80 km SE of Abha on the road to Najran; by the roadside. 7,000 ft.



Astragalus spinosus ◆

An erect bushy leafy spiny shrublet 60 cm high; white flowers 2 cm long, occasionally flushed with pink; the calyx enlarges and becomes like a papery balloon enclosing the fruit. A very widespread shrub north of Madinah.

Between Hanakiyah and Nuqrah, on the Madinah-Qassim road; in hard sand near the roadside. 2,500 ft.



***Astragalus trachoniticus* ◆**

A prostrate herb with white radiating stems 8 cm long and silvery leaves; lilac flowers 3 cm long with yellow keel and hairy blackish calyx, in loose heads; no scent. Fairly widespread locally but not abundant.

Turayf Camp (31° 40' N, 39° 29' E), near Turayf; in drifted sand over limestone. 2,900 ft.



***Astragalus tribuloides sensu lato* ◆**

A prostrate spreading leafy herb with stems 13 cm long; white flowers 4 mm long; upward-curving pods in groups of three or four. A variable plant.

Near Riyadh al Khabra, on the Madinah road SW of Buraydah; in a fallow field near the roadside. 2,000 ft.



***Astragalus tribuloides var. minutus* ◆**

A small leafy prostrate herb with stems 8 cm long; pale lilac flowers 3 mm long; short plump erect hairy pods, usually in groups of three. Fairly widespread.

Near Zabirah, 200 km north of Buraydah; in a claypan in a wide sandy wadi. 1,800 ft.



Astragalus vogelii ▼

A prostrate leafy herb with stems 15 cm long spreading fanwise; deep lilac flowers 2 mm wide, in loose spikes; short slightly hairy pods alternate on the stem. Locally widespread.

Between Dhahaban and the coast 60 km north of Jiddah; in sand in a small date grove. 30 ft.

Astragalus* sp. aff. *tribuloides* var. *tribuloides ▲

A delicate prostrate leafy herb with short stems 6 cm long; erect pure white flowers 1.3 cm long.

In a watered valley in the Jabal Ash Shati range, 30 km NE of Ash Sharmah; in damp granite sand. 4,000 ft.

Astragalus* sp. aff. *tribuloides ▼

A prostrate leafy herb with radiating stems 15 cm long; blue-lilac flowers 3 mm wide; stout upward-curved seed pods 8 mm long in groups of three or four.

Zabirah, 200 km north of Buraydah; in hard sand among vegetation in wide wadi. 1,800 ft.





◆ ***Astragalus* sp. (section *Rhacophorus*)**

A very bushy shrub 45 cm tall with narrow leaves tipped with a spine and slender closely packed golden-brown spines and white woolly stems; in fruit; tiny white hairy pods 3 mm long buried in the wool on the stems. Locally common. Similar to *A. spinosus*, which has more loosely packed white spines and is spring flowering.

Jabal Dabbagh, a 7,500 ft granite massif 88 km south of Tabuk; on the crest of a NE spur. 6,500 ft.



◆ ***Astragalus* sp. 1811**

A prostrate leafy herb with stems 15 cm long; sessile lilac flowers 5 mm long, in tight clusters.

Aban al Ahmar, a granite massif 143 km SW of Buraydah; in a small date grove just below the summit. 3,800 ft.



◆ ***Astragalus* sp. 1826**

A semi-prostrate leafy herb with stems to 25 cm long; lilac flowers 1.3 cm long, in short spikes; pods in tight groups of three or four.

Near Riyadh al Khabra, west of Buraydah on the Madinah road; in hard sand in a fallow field. 2,000 ft.



◆ ***Astragalus* sp. 1000**

A leafless green-stemmed shrublet 45 cm high; narrow white flowers 1.5 cm long.

Between Shiqri and Tabuk; in drifted red sand among sandstone buttes. 3,100 ft.

◆ ***Astragalus* sp. 2408**

A hairy leafy prostrate herb with stems to 13 cm long; white lilac-striped flowers 6 mm long; single curved pods.

Near Hanakiyah, between Madinah and Qassim; near a red sandstone outcrop, in hard sand. 2,800 ft.





***Astragalus* sp. 3426** ◆

A white hairy leafy herb, the leaves having red stalks and margins; yellow flower 3.2 cm long including the very hairy pale brown calyx; no scent.

Turayf Camp (31° 40'N, 39° 29'E); in shallow sandy run-off on limestone plateau. 2,900 ft.



Biserrula pelecinus ◆

A usually prostrate leafy slightly hairy herb with stems to 15 cm long, the leaves notched at the tip; white flowers flushed with pink 6 mm long, in pairs or threes on a long stalk; no scent; flat pods 2 cm long with frilled margins. Locally widespread.

Between Al Bahah and Jabal Ibrahim, off the Taif-Abha road; in hard sand on a stony hillside. 7,000 ft.



Cadia purpurea ◆

An erect branching very leafy shrub 1.5 m high; pendent white flowers 2 cm wide aging dark pink. Widespread in scattered localities near Abha. It may be poisonous as it is not grazed.

Near Talhah, on the Abha-Najran road; in a small rocky ravine. 7,000 ft.



Cassia holosericea ▲

A very leafy bushy herb 60 cm high; pale yellow flowers 1.5 cm wide, in spikes; wide flat curved pods. This species is easily confused with *C. senna*, but the leaflets are not as long and pointed. Very widespread around Jiddah and Makkah.

Wide sandy ditch between new Jiddah Airport and Madinah road, Jiddah; in hard sand. 20 ft.

Cassia occidentalis ◆

An erect bushy leafy shrub 1 m high; yellow flowers 2 cm wide. One of the few Arabian *Cassia* species with erect long narrow pods.

Wadi al Uss, on the western slope of Jabal Sawdah, NW of Abha, 10 km NW of the Police Post; in hard sand near cultivation. 2,800 ft.



◆ ***Cassia italica***

A rather straggly leafy branching herb with stems 20 cm long and large coarse leaflets; large yellow flowers 2.2 cm wide with darker veins; wide flat curved pods. Very widespread.

Between Madinah and the Yanbu al Bahr turn-off; by the roadside. 1,800 ft.



Cassia senna ◀

An erect branching leafy herb 1.25 m high with long narrow pointed leaflets; bright yellow flowers 2 cm wide, in spikes; wide flat curved pods. Abundant in scattered localities and easily confused with *C. holosericea*.

80 km SE of Qunfudhah; in low foothills, among acacias. 100 ft.



Cicer cuneatum ◀

A leafy herb with slender stems, dentate leaflets and leaf-tip tendrils; blue-lilac flowers 1 cm wide; no scent; fat hairy pods.

Between Jabal Ibrahim and Al Bahah, off the Taif-Abha road; climbing through grass on a steep rocky hillside. 6,000 ft.



Cassia tora ◀

A bushy leafy herb 60 cm tall with leaves having only three pairs of leaflets; erect very narrow pods 16 cm long and 5 mm wide. Growing with *C. occidentalis*, which has at least four pairs of leaflets and flatter pods. The flowers not seen.

Wadi al Uss, on the western side of Jabal Sawdah, 10 km NW of Police Post; in hard sand near cultivation. 2,850 ft.



Clitoria ternatea ◀

A tangled leafy vine scrambling over a 5 m-high shrubby tree; solitary bright rich blue flowers 3 cm wide; no scent.

Abha-Jizan road, near the Ad Darb junction; at the edge of small steep wadi lined with Dom Palms. 100 ft.



Colutea istria ◆

A slender-stemmed shrub 3.5 m high; large shiny yellow flowers 3 cm wide; no scent; ripe pods cream flushed with red, becoming inflated.

Jabal Harb, a granite mountain near Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; in a granite ravine. 5,000 ft.



Crotonalaria aegyptiaca ◆

A twiggy tiny-leaved shrublet 30 cm high; yellow flowers 1 cm long. 15 km SE of Khamis Mushayt; in crevices of a granite outcrop. 6,000 ft.



Crotonalaria emarginella ◆

A bushy leafy herb 40 cm high; yellow flowers 1.2 cm wide, in spikes, the round standard petal is flushed reddish on the back. Very widespread in scattered localities.

Halfway down the escarpment, Jiddah-Taif road; on a steep rocky hillside. 4,000 ft.



Crotonalaria leptocarpa ◆

A prostrate herb with radiating leafy stems 35 cm long, the trifoliate leaves having the centre leaflet somewhat larger; pale yellow flowers 8 mm wide with green veins; no scent; inflated oval pods.

Ash Sha'ib, 25 km ENE of Hamdah; in hard sand near the camp drains. 3,800 ft.



Crotalaria microphylla ◆

A many-branched prostrate leafy herb with stems 20 cm long; pale pink flowers 8 mm wide with deeper veining; unscented. Widespread, with variably coloured flowers, sometimes white, yellow, or purplish-red.

10 km south of Jiddah, near the sewage works; in hard sand. 10 ft.



Crotalaria senegalensis ◆

A branching leafy herb 15 cm tall; bright yellow flowers 1.3 cm long with a few reddish streaks on the standard, in terminal spikes; inflated fruits 1 cm long.

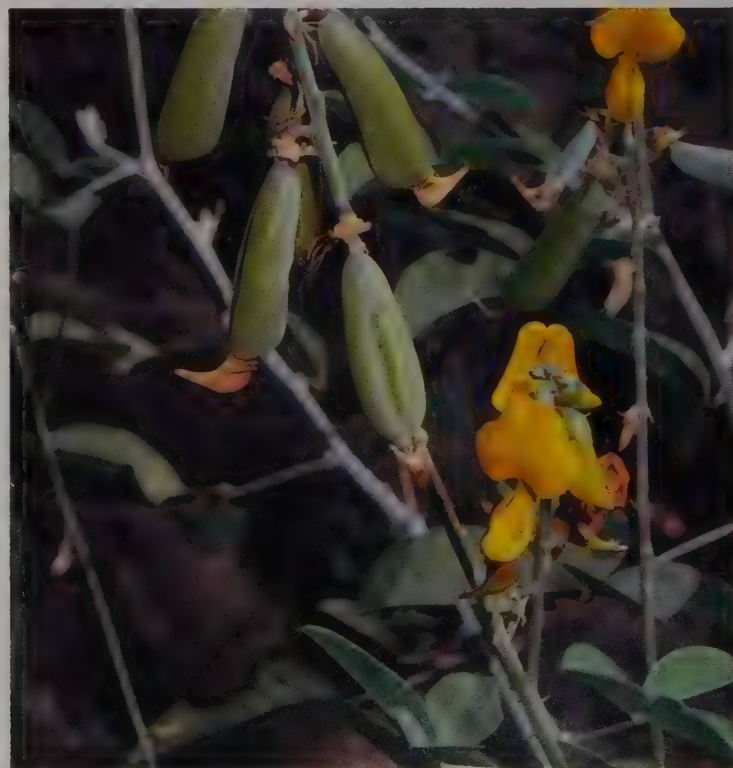
150 km south of Jiddah, Al Lith road; in hard sand among lava blocks. 200ft.



Crotalaria quartiniana ◆

A weak-stemmed shrubby herb 40 cm tall with slightly rounded trifoliolate leaves; yellow flowers 1.2 cm wide with bluish marks at the base of the standard petal; smooth evenly rounded pods.

Jabal Fayfa, 100 km NE of Jizan, on steep SW approach road; in sand by the roadside near cultivation. 4,100 ft.



***Crotalaria* sp. nov.** ◆

A bushy shrublet 60 cm tall with silvery stems and wide trifoliolate leaves, silvery underneath; bright yellow flowers 2.5 cm long; no scent; inflated downy pods with a deep groove along the flattened surface.

12 km north of Muhayl road junction, Jizan-Qunfudhah road; among lava blocks near sea shore. 5 ft.



Cyamopsis senegalensis ♀

A small herb 5 cm high with long narrow leaflets; pale lilac flowers 6 mm long with a creamy standard petal; strikingly erect pods 4.5 cm long.

Low rocky hills, 10 km east of Jiddah; in drifted sand. 80 ft.



Delonix elata ♀

A many-branched shrubby tree 4 m high; white flowers aging yellow 5 cm wide, the petals with frilled edges. A widespread plant, in the south it is found as a single-trunked tree 10 m tall.

Near the junction of the Makkah By-Pass with the road to Al Lith; amidst a jumble of round grey granite boulders. 300 ft.



◆ ***Desmodium gangeticum*** ♀

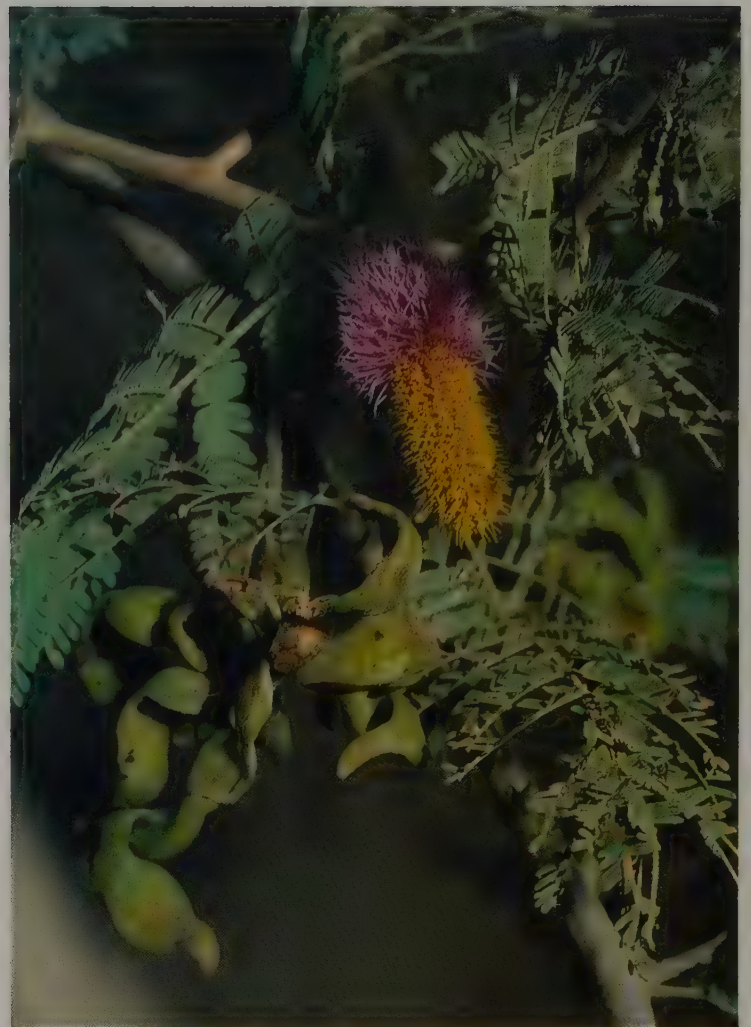
A small branching herb with slender woody stems 12 cm long and oval leaves; pale blue flowers 3 mm long; segmented pod-like fruits 2.5 cm long.

Jabal Fayfa, 100 km NE of Jizan; on steep rocky hillside halfway down the western spur road. 3,000 ft.



Dolichos trilobus ◆

A tangled leafy vine with stems 1 m long; rosy-lilac flowers 1.5 cm wide. Jabal Fayfa, 100 km NE of Jizan; scrambling over grasses on a steep hill-side. 5,300 ft.



Dichrostachys cinerea ◆

A sparsely branching shrub with stems to 1.5 m long and large leaves with many leaflets; tiny flowers in tassels 3 cm long, the basal half with rose-pink male flowers, the apical half with brownish female flowers; very tangled spirally curved fruits. Locally abundant.

Jabal Fayfa, 100 km NE of Jizan; on a steep hillside. 5,000 ft.



◆ ***Glycine wightii* ssp. *longicauda***

A tangled vine with stems 7 m long or more; blue flowers 4 mm wide with darker marks on the standard, in erect spikes; no scent.

Near Jabal Ibrahim, off the Taif-Abha road; climbing over large juniper in well-wooded gully. 6,800 ft.



Hippocrepis ciliata ◆

A leafy prostrate herb with branching stems 4 cm long; creamy flowers 5 mm long with red veins; fruits deeply incised along one margin.

Near Hamdah, north of Khamis Mushayt; in hard sand near a large wadi. 4,400 ft.

Hippocrepis* sp. aff. *ciliata ◆

A prostrate branching herb with stems 20 cm long; creamy-white flowers 5 mm long; the slightly curved pods are deeply notched along one edge and similar to those of *H. unisiliquosa*, which has yellow flowers.

Near Nabhaniyah, 100 km SW of Buraydah; in hard sand by shallow run-off. 2,300 ft.



Hippocrepis constricta ◆

A small leafy semi-prostrate herb with stems 8 cm long; creamy-yellow flowers 5 mm-wide, veined with red; slightly curved pods constricted between the seeds.

Bir al Hamdah, near the Gulf of Aqaba; on a gravelly plain. 900 ft.

Hippocrepis bicontorta ◆

A prostrate branching herb with stems 30 cm long; yellow flowers 5 mm long, in clusters; the slender pods become deeply 'horned' and twisted as they age. Locally widespread.

Near Zabirah, 200 km north of Buraydah; in hard sand among bushy herbs. 1,800 ft.



Indigofera arabica ◆

A prostrate branching leafy herb with stems to 20 cm long; bright scarlet flowers 5 mm wide; short hairy pods. A very widespread plant in the southern Asir, but frequently grazed to form a 'cushion' herb.

Between Abha and Talhah, on the road to Najran; in granite sand by the roadside. 7,000 ft.

***Hippocrepis unisiliquosa*** ◆

A prostrate herb with stems to 25 cm long; bright yellow flowers 4 mm wide; long slender pods deeply notched along one edge, similar to *H. ciliata*. Locally widespread.

Wadi Sabha, near Zabirah, 200 km north of Buraydah; in a shallow wadi over a limestone escarpment. 1,800 ft.

***Indigofera articulata*** ◆

A very leafy bushy herb 30 cm tall with pale glaucous leaves; pale scarlet flowers 8 mm long; no scent; the small few-seeded pods constricted between the seeds.

Partway down Grandi Lavori road, south of Baljurshi; by the roadside. 6,500 ft.

***Indigofera caerulea*** ◆

A bushy leafy shrublet 50 cm tall with bright green leaves having seven or more leaflets; red flowers 6 mm long, the yellowish standard red veined; short slightly constricted cylindrical pods. Locally widespread.

Farasan Island, west of Jizan; in crevices in fossil coral. 50 ft.



Indigofera colutea ◆

A branching prostrate leafy herb with hairy stems 25 cm long; small pale red flowers 3 mm wide.

Near Suq al Ahad, 35 km east of Qunfudhah; in sand near cultivation. 40 ft.



Indigofera disjuncta ◆

A bushy leafy herb 10 cm high; pale red flowers 5 mm long.

Low rocky hills 10 km east of Jiddah; in hard sand. 80 ft.



Indigofera hochstetteri ◆

A leafy prostrate branching herb with stems to 60 cm long; scarlet flowers 3 mm wide, which open singly, in spikes; pagoda-like clusters of short flat curved pods. Widespread in the southern foothills.

Wadi Khulays, 75 km NNE of Jiddah; at the edge of an irrigated field. 200 ft.



Indigofera linifolia ◆

A prostrate herb with radiating stems 30 cm long and trifoliate leaves, the centre leaflet long and narrow, the two side ones greatly reduced; dark red flowers 3 mm long, in short spikes; spherical single seeded white-downy fruits.

150 km south of Jiddah, Al Lith road; in hard sand at base of lava flow. 100 ft.



Indigofera oblongifolia ◆

A wide spreading leafy shrublet 45 cm high and 1 m wide; light scarlet flowers 4 mm wide, in spikes. Widespread in the southern lowlands and seldom grazed.

Between the new Jiddah Airport and the Madinah Road, Jiddah; in a sandy ditch. 20 ft.



Indigofera schimperi ◆

A many-branched leafy woody shrublet 60 cm high and 1.25 m wide; rosy-pink flowers 8 mm long, the standard petal greenish, in spikes; sweetly scented.

Near Zahran, between Khamis Mushayt and Najran; by the roadside, in gravel. 6,000 ft.



Indigofera phillipsiae ◆

A prostrate herb with stems 30 cm long; red flowers 3 mm wide; narrow cylindrical fruits 1.2 cm long, in spikes to 20 cm long.

Grandi Lavori road, 25 km from its junction with Jiddah-Jizan road; in granite sand among shrubs. 2,500 ft.



Indigofera semitrijuga ◆

A low semi-prostrate herb with stems to 30 cm long and small silvery leaves; dark red flowers 4 mm long; short white-hairy two-seeded pods in spikes.

Farasan Island, off Jizan; in drifted sand over fossil coral, among grasses. 10 ft.



Indigofera sessiliflora ▲

A small prostrate herb with stems 15 cm long; tiny red flowers 3 mm wide; narrow cylindrical pods in short pagoda-like spikes.

On the Jiddah-Al Lith road, 40 km north of Al Lith; by a granite outcrop, in hard sand. 100 ft.



Indigofera spinosa ▲

A grazed bushy spiny shrublet 30 cm high; the pale scarlet flowers 8 mm long grow from the young spines. A very widespread plant.

Between new Jiddah Airport and Madinah Road, Jiddah; in a wide sandy ditch. 20 ft.



Indigofera spiniflora ▲

A grazed twiggy shrublet 30 cm tall with silvery leaves; pale red flowers 4 mm long, opening singly, in spikes.

Between Jiddah and Wadi Khulays; in sand among basalt blocks. 500 ft.



***Indigofera* (? *trita*)** ◆

A wide bushy leafy shrublet 1 m tall with four or five-foliolate leaves; pale red flowers 6 mm long, opening singly, in spikes.

Jabal Fayfa, 100 km NE of Jizan; by the roadside on a steep bank. 5,200 ft.



Indigofera* sp. aff. *trita ◆

A erect straggly shrub with slender branching stems 1.25 m high and silvery trifoliate leaves; small pale scarlet flowers 4 mm long, in spikes.

Wadi Kharar, near the foot of the escarpment, Jiddah-Taif road; in a rocky ravine. 1,500 ft.

***Indigofera* sp. 3234** ◆

A shrubby herb 20 cm tall with brittle stems and greyish leaves; scarlet flowers, the relatively large rounded standard 6 mm wide, in short spikes.

Wadi Kharar, off the escarpment, Jiddah-Taif road; on steep rocky hillside. 1,500 ft.

Indigofera tritoides ◆

A semi-prostrate herb 8 cm high; pale scarlet flowers 6 mm wide, in erect spikes.

Low rocky hills, 10 km east of Jiddah; in hard sand. 80 ft.



Indigofera* sp. aff. *volkensis ◆

A prostrate leafy herb with stems to 25 cm long; deep pink flowers 6 mm long, in spikes; no scent.

Jabal Fayfa, 100 km NE of Jizan; near the summit, by the roadside. 5,400 ft.





◆ ***Lablab purpureus***

A tangled very leafy vine with stems several metres long; white flowers 1.5 cm wide, in erect spikes. A purple colour form also abundant. An escape from cultivation though not apparently harvested.

Jabal Fayfa, 100 km NE of Jizan; on retaining walls and steep banks near houses. 5,400 ft.



◆ ***Lathyrus pratensis***

A weak-stemmed herb with squared stems 30 cm long, leaf tip tendrils and bifoliate leaves; rather round yellow flowers 1 cm long, in a dense terminal head on a flower stalk 10 cm long; no scent.

The waterfall beauty spot between Abha and Jabal Sawdah; scrambling through tangled herbs at edge of stream. 8,500 ft.



◆ ***Lathyrus aphaca***

A weak-stemmed leafy herb climbing by tendrils with stems 15 cm long and with hastate leaves arranged in pairs, clasping the stem; lemon-yellow flowers 1 cm wide, the standard petal very round; no scent.

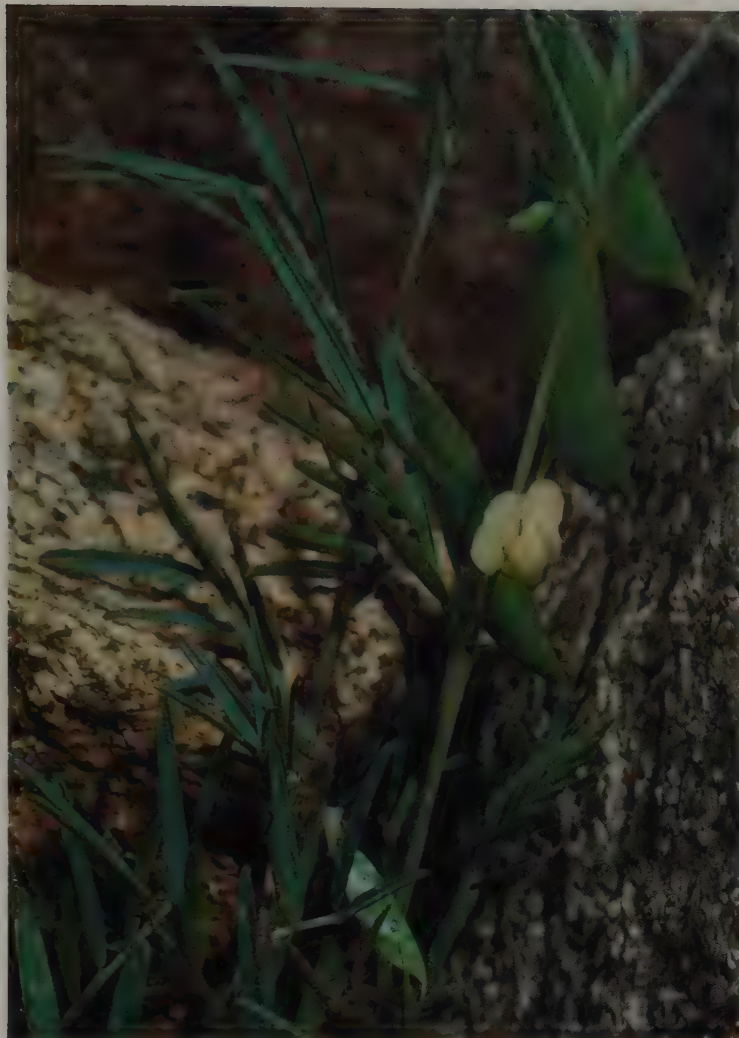
Near Al Hadda, off the Jiddah-Taif road; in a fallow field near cultivated ground. 7,000 ft.

◆ ***Lathyrus cicera***

A scrambling herb climbing by tendrils with narrow grass-like leaves and stems 15 cm long; scarlet flowers 1.2 cm wide. Fairly widespread in the southern mountains.

8 km SW of Al Hadda near Taif; at the edge of a fallow field. 6,800 ft.





◆ ***Lathyrus saxatilis***

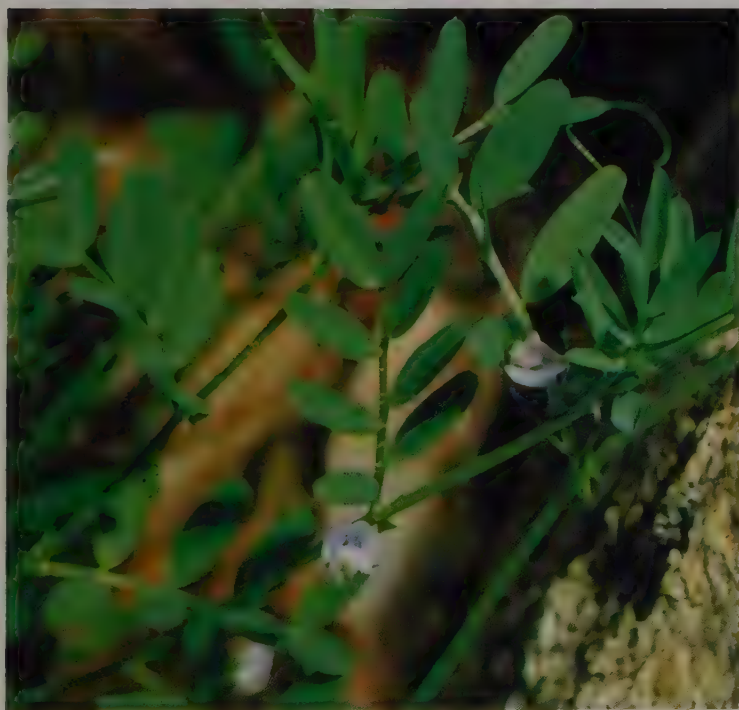
A slender erect herb 15 cm tall, with very narrow leaves; white flowers 6 mm wide.

Red granite mountain 15 km SW of Al Hadda, near Taif; in a steep ravine, under junipers. 7,000 ft.

◆ ***Lotononis platycarpus***

A prostrate branching slightly downy leafy herb with stems 7 cm long; yellow flowers 4 mm long. A very widespread plant mainly south of Madinah, often forming small mats.

Near Wadi Wejj, 25 km south of Taif; in a small sandy gully. 6,800 ft.



◆ ***Lens orientalis***

An erect leafy herb 15 cm high, climbing by tendrils which arise from the leaf tip; tiny blue-lilac flowers 3 mm wide.

Red granite mountain 15 km SW of Al Hadda, near Taif; on a rocky slope near the lip of the escarpment. 7,000 ft.



◆ ***Lotus* sp. aff. *arabicus***

A bushy leafy herb 60 cm high; pale pink flowers 5 mm wide, in heads.

Near Talhah, on the Abha-Najran road; in hard sand by the roadside. 7,000 ft.



◆ ***Lotus corniculatus***

A prostrate many-stemmed leafy herb with stems 10 cm long; yellow or reddish orange flowers 7 mm wide, in heads; unscented. Locally widespread, usually near cultivation.

Najran; the grassy bank of an irrigated wheatfield near town. 4,500 ft.



◆ ***Lotus halophilus***

A branching prostrate leafy herb with stems to 30 cm long; bright yellow flowers 4 mm long, single or in pairs at the apex of the stems. Fairly widespread locally.

Near Zabirah, 200 km north of Buraydah; in hard sand near a bauxite outcrop. 1,800 ft.



◆ ***Lotus corniculatus* var. *eremanthus***

A very leafy prostrate herb, the glaucous leaves crowded along the 10-cm-long stems; deep yellow solitary flowers 7 mm long flushed with scarlet.

Tannumah, a watered valley 12 km south of An Nimas, Taif-Abha road; on the river bank. 6,500 ft.

◆ ***Lotus lanuginosus*** ◆

A straggly leafy herb with stems 25 cm long, the whole covered with white downy hairs; rose-pink flowers 1 cm long; no scent.

Near Hamdah, north of Khamis Mushayt; in grass tufts on a large granite outcrop. 5,000 ft.





***Macrotyloma axillare* var. *axillare* ◆**

A tangled leafy vine with stems several metres long; pale yellow flowers 2 cm long, the standard with a bluish blotch.

Jabal Fayfa, 100 km NE of Jizan, on steep SW approach road; in hard sand at base of cliff. 4,200 ft.



***Lotus* sp. aff. *quinatus* ◆**

A bushy leafy herb 30 cm high; pink flowers 7 mm long aging red, in heads. Locally very widespread, especially near the roadside.

Near Al Bahah, on the Taif-Abha road; in hard sand by the roadside. 7,000 ft.

***Lotus schimperi* ◆**

A leafy branching prostrate mat-forming herb with stems 15 cm long; tiny white flowers 3 mm wide, wing petals tipped with pink.

Between Dhahaban and the coast, 60 km north of Jiddah; at the edge of a small palm grove. 30 ft.





◆ ***Medicago laciniata***

A prostrate branching herb with yellow flowers 3 mm wide; spirally coiled coarse-spiny fruits.

Near Riyadh al Khabra, on the Qassim-Madinah road; on the fringe of an irrigated field. 2,000 ft.



◆ ***Medicago laciniata* var. *brachyacantha***

A small prostrate leafy herb with yellow flowers 3 mm wide; spirally coiled coarse-hairy fruits.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; in a rock crevice near the crest of steep rocky hill. 3,000 ft.



◆ ***Medicago lupulina***

A prostrate leafy herb with stems 25 cm long; tiny yellow flowers less than 1 mm wide, in short spikes; distinctive ridged oval fruits in heads 1 cm long.

The waterfall beauty-spot between Abha and Jabal Sawdah; in damp sand among reeds near the stream. 8,500 ft.



◆ ***Medicago minima***

A branching semi-prostrate leafy herb with stems 15 cm long; yellow flowers 3 mm wide; slightly spirally coiled soft-spiny fruits 7 mm in diameter.

Halfway up the escarpment, Jiddah-Taif road; in a rocky ravine. 4,500 ft.



Medicago orbicularis ◆

A prostrate herb with radiating leafy stems 25 cm long, the leaves with dentate margins; solitary yellow flowers 3 mm wide; flattened coiled glabrous fruits.

Riyadh: a weed in the lawn of the Agricultural and Water Research Centre. 2,000 ft.



Medicago polymorpha ◆

A prostrate branching leafy herb with stems to 18 cm long; yellow flowers 4 mm wide; flat spirally coiled spiny fruits.

On the road to the Queens' Forest, Al Bahah, off the Taif-Abha road; in an abandoned field among junipers. 7,500 ft.



Melilotus alba ◆

An erect leafy herb 1 m tall, the blunt-tipped trifoliate leaves having dentate margins; white flowers 5 mm long, in a crowded spike; sweet scent; small oval fruits. An escape from cultivation.

Mahalla reservoir, near Abha; in damp sand among *Tamarix* bushes. 6,000 ft.



Melilotus indica ◆

A bushy leafy herb 40 cm tall, the trifoliate leaves with dentate margins; yellow flowers 1 mm wide, in narrow spikes; sweet hay smell; smooth round fruits.

Near Jabal Ibrahim, off the Taif-Al Bahah road; on a rocky hillside. 6,000 ft.



Onobrychis ptolemaica ◆



Ononis natrix sensu lato ◆



Prosopis farcta ◆



Prosopis juliflora ◆

◆ ***Onobrychis ptolemaica***

A leafy-based herb, the large leaves forming a rosette and with flower stems to 12 cm long; pale yellow flowers 1.8 cm long with red veins. Very widespread, especially in the north.

97 km west of Buraydah; in a rock crevice of a large sandstone outcrop. 2,800 ft.

◆ ***Ononis natrix sensu lato***

An erect dense bushy shrublet 30 cm high with glandular sticky leaves; yellow flowers 8 mm wide with a red-veined standard petal; unpleasantly aromatic. Widespread on the northern side of the mountain.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; in a steep shallow ravine. 5,500 ft.



◆ ***Ononis reclinata***

A leafy prostrate slightly hairy herb with stems 10 cm long; pale pink flowers 5 mm wide. Locally widespread.

Near Al Bahah, off the Taif-Abha road; on a rocky hillside. 7,000 ft.

◆ ***Pisum sativum* var. (? *arvense*)**

An erect leafy herb 20 cm high climbing by tendrils; pinkish lilac flowers with reddish purple wings, the standard 2 cm wide; no scent; small pea-like pods.

Between Baljurshi and An Nimas, on the Taif-Abha road; in a small abandoned terraced field on a steep hillside. 6,500 ft.

◆ ***Prosopis farcta***

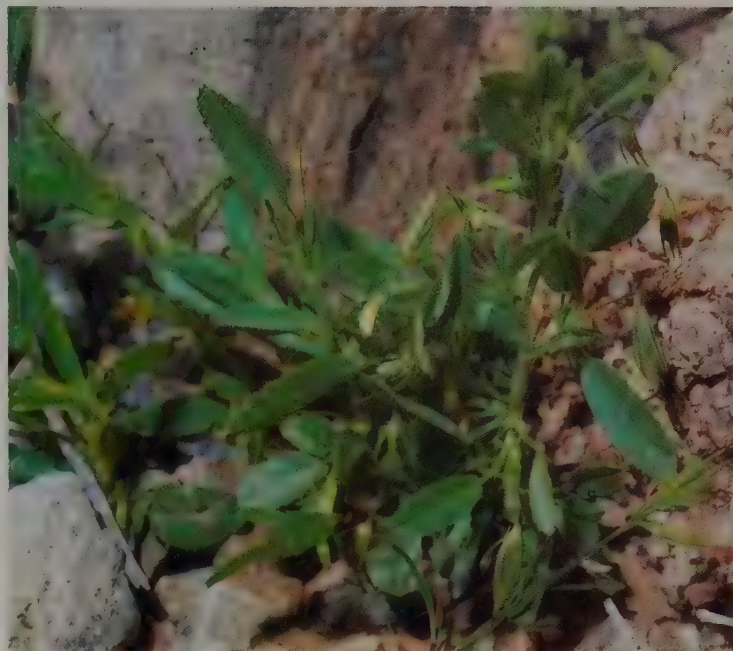
A leafy bushy shrub 35 cm tall with prickly stems; cream flowers 5 mm wide, in erect narrow spikes to 10 cm long; stout fleshy purple-brown pods. Old plants can grow into small trees.

Riyadh; a weed in the Agricultural and Water Research Center. 2,000 ft.

◆ ***Prosopis juliflora***

A flat-topped shrubby tree to 4 m tall with very bright green leaves, short paired spines and finely fissured pale grey trunk; creamy flowers 3 mm wide, in tassels 8 cm long; no scent; pale yellow rather fleshy long narrow pods, the sticky flesh aromatic of curry. Originally an introduction from America, but now quite wild.

Farasan Island; 4 km SE of Farasan village; in thin sand over fossil coral. 30 ft.



◆ ***Ononis sicula***

An erect slender-stemmed slightly hairy leafy herb 7 cm high; yellow flowers 6 mm long with long sepals; no scent.

Jabal Dabbagh, a 7,500 ft granite mountain 88 km SW of Tabuk; among rocks on an andesite spur. 5,500 ft.





Psoralea plicata ▲

A wide bushy twiggy herb 60 cm high with small pleated leaves and tiny wart-like glands along the stems; tiny white flowers 2 mm wide with lilac-tipped petals, in spikes; unscented. A fairly widespread weed in the lowlands south of Madinah.

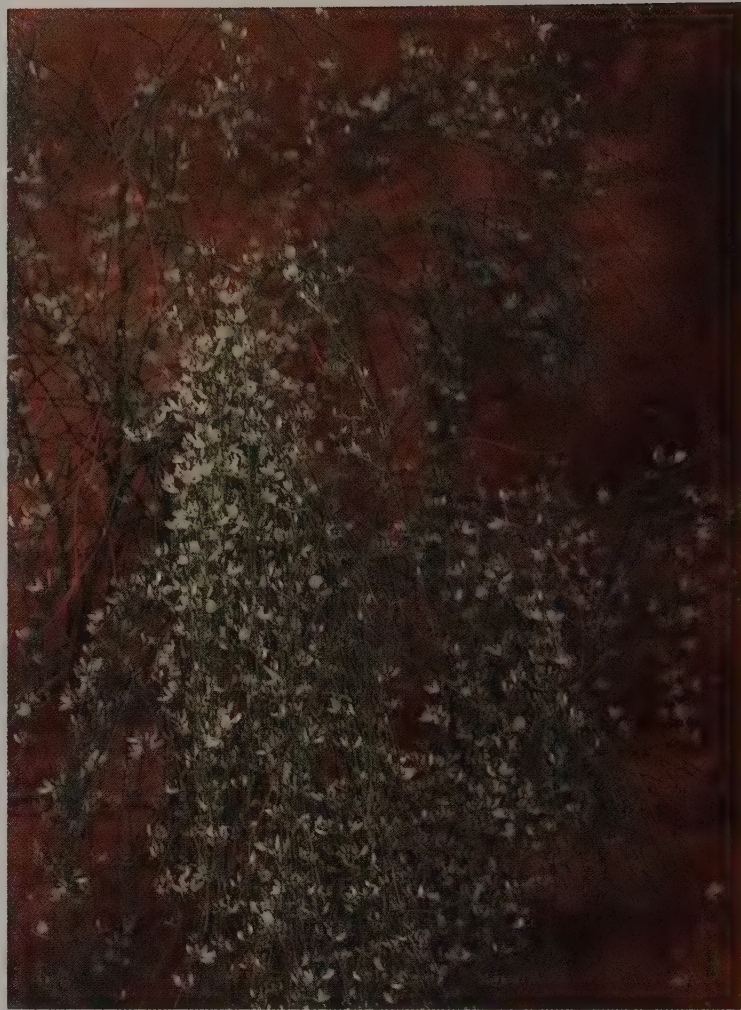
10 km south of Jiddah, near the sewage works; by a muddy silt-pan. 10 ft.



Rhynchosia buramensis ▲

A leafy shrubby twiner with stems to 1 m long; bright yellow flowers 1.5 cm long and 1 cm wide, the standard veined with dark green; no scent. A rare species.

Jabal Fayfa, 100 km NE of Jizan; climbing through a shrub on a steep rocky hillside. 5,300 ft.



Retama raetam ▲◆

An erect slender green-stemmed bushy leafless shrub 3 m high; white flowers 8 mm long in broom-like sprays; faintly scented. Locally very widespread.

Near Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; in rocky ground. 2,000 ft.





◆ ***Rhynchosia malacophylla*** ◆

A leafy bushy twining herb 30 cm high; bright yellow flowers 1.5 cm wide with faint reddish veins, in spikes 10 cm long. A widespread species in the southern mountains and very variable.

Near the summit of the escarpment, Jiddah-Taif road; in crevices of a cliff by the roadside. 5,000 ft.

◆ ***Rhynchosia malacophylla* vergens ad *R. minima*** ◆

A trailing vine with stems to 1 m long; apricot-yellow flowers 8 mm wide with reddish veins on the back of the standard, in spikes; no scent.

Najran; among rocks in the wadi below the New Dam. 4,500 ft.





Rhynchosia memnonia ▲

A vine-like herb with stems 45 cm long and leaves prominently veined on the underside; yellow flowers 8 mm wide with red-veined standard, in axillary spikes; no scent.

55 km ENE of Hamdah; in a ravine among sandstone buttes, scrambling through grass tufts. 4,400 ft.



Rhynchosia* sp. aff. *minima ▲

A tangled leafy vine 70 cm long and with small trifoliolate leaves; dying yellow flowers 7 mm long, in spikes; small two-seeded pods.

Jabal Fayfa, 100 km NE of Jizan; on steep vegetated hillside near cultivation. 4,800 ft.



Rhynchosia minima* var. *minima ▲

A tangled vine with stems several metres long and small leaves; yellow flowers 5 mm wide with reddish veins, in long spikes.

Farasan Island, off Jizan; scrambling through bushes growing in crevices of fossil coral. 10 ft.



Rhynchosia pulverulenta ▲

A weak-stemmed slightly downy leafy herb scrambling through a low acacia; yellow flowers 6 mm wide; evening flowering.

Low rocky hills, 10 km east of Jiddah; in a shallow ravine, among rocks. 80 ft.

Rhynchosia* sp. aff. *usambarensis ◆

A tangled leafy vine with stems to 2 m long, the leaves with silvery dappling along the midrib; pale yellow flowers 1 cm long, the standard veined with red; glabrous two-seeded pods.

Jabal Fayfa, 100 km NE of Jizan; scrambling over grasses on a steep hillside. 5,300 ft.

Rhynchosia* sp. aff. *schimperi ◆

A partly grazed woody leafy shrublet with stems to 40 cm long and silvery leaves; yellow flowers 7 mm wide; short, flat pods.

In the university compound, Abha; on rocky hillside. 6,000 ft.

***Rhynchosia* sp. nov.** ◆

A grazed twiggy shrublet 20 cm high; yellow flowers with dark reddish brown standard petal 9 mm wide, in spikes; no scent.

Near Bani Rizam, 18 km north of Abha; on a rocky hillside. 7,500 ft.

Rhynchosia totta ◆

A slender leafy vine with stems 30 cm long and small dark green trifoliate leaves; yellow flowers 7 m long with reddish standard petal, borne singly; slightly hairy two-seeded pods.

Wadi Habaqah, 32 km south of Baljurshi, Taif-Abha road; in crevice of cliff. 6,200 ft.



◆ ***Sesbania sesban***

A slender branching erect herb 1.25 m high, each long leaf with many tiny leaflets; bright yellow flowers 1 cm long, the standard petal heavily spotted with dark green on the outside; pods long and wire-like.

Near Suq al Ahad, 35 km east of Qunfudhah; in sand on a wide plain, close to cultivation. 30 ft.

◆ ***Tamarindus indica*** ▼

A dying tree 5 m tall with a very leafy crown; red-veined yellow flowers 1.6 cm wide with reflexed petals; no scent; fat brown-hairy pods. Fairly common in the wadis approaching Jabal Fayfa where trees 15 m tall grow apparently untended.

Between Jiddah and Wadi Khulays; in abandoned date grove. 200 ft.



◆ ***Stylosanthes fruticosa***

A densely bushy leafy shrublet with small pale green trifoliate leaves; yellow flowers 4 mm wide; no scent.

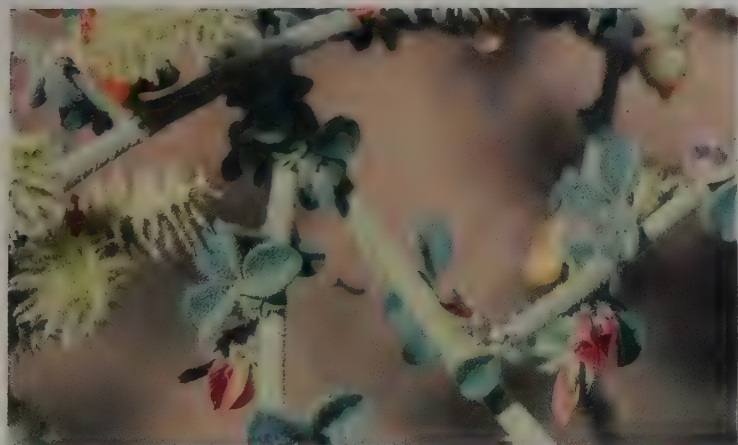
Jabal Fayfa, 100 km NE of Jizan; on a rather open, rocky hillside. 5,300 ft.



◆ *Taverniera aegyptiaca* ◆

An erect bushy twiggy herb 45 cm high with small leaves; deep pink flowers 1.2 cm long and 8 mm wide with darker veins; unscented; small two-seeded spiny pods hidden by the persistent dead papery petals. Locally common.

Between the new Jiddah Airport and Madinah road, Jiddah; in a wide sandy ditch. 20 ft.



◆ *Taverniera lappacea* ◆

A semi-prostrate branching woody herb with stems to 60 cm long and small slightly downy leaves; reddish flowers 8 mm long and 5 mm wide with darker veins; flat oval stiff-hairy pods.

Between new Jiddah Airport and Madinah road, Jiddah; in a wide sandy ditch. 20 ft.



◆ *Tephrosia apollinea* ◆

An erect branching leafy woody herb 30 cm high; bright pink flowers 7 mm long.

On the main road to Madinah between the city and the Yanbu al Bahr turn-off; in gravelly sand by the roadside. 1,000 ft.



◆ ***Tephrosia desertorum***

A slender erect herb 20 cm high; deep rosy-red flowers 8 mm wide.
Low rocky hills, 10 km east of Jiddah; in drifted sand near a rocky outcrop. 80 ft.

◆ ***Tephrosia nubica***

A bushy leafy grey-green shrublet 40 cm high; pale magenta flowers 1.5 cm long; pods covered in long soft white hairs. Evening flowering.
A very widespread species.
Makkah By-Pass Road, 110 km from Jiddah; in a shallow rocky ravine. 500 ft.



◆ ***Tephrosia pumila***

A weak-stemmed downy leafy herb with stems 60 cm long; deep pink flowers 6mm long.

Jabal Fayfa, 100 km NE of Jizan, on steep SW approach road; among scrub in shade of large boulders. 4,000 ft.



◆ ***Tephrosia purpurea***

A semi-prostrate straggly herb with stems to 45 cm long; bright reddish purple flowers 7mm wide. The leaves have many leaflets.
10 km south of Jiddah; in hard sand of coastal plain. 20 ft.



***Tephrosia purpurea* ssp. *leptostachya* var. *leptostachya* ♣**
A trailing semi-prostrate leafy herb with stems to 60 cm long; bright magenta-pink flowers 7 mm wide; unscented.

Near Suq al Ahad, 35 km east of Qunfudhah; in sand near cultivation. 30 ft.



***Tephrosia purpurea* ssp. *leptostachya* var. *pubescens* ♣**
An erect very bushy leafy shrublet 60 cm high; magenta-pink flowers 6 mm wide; faintly scented. Locally widespread.

Near the foot of the escarpment, Jiddah-Taif road; in a shallow wadi in granite sand. 1,000 ft.



***Tephrosia* sp. aff. *quartiniana* ♣**
A branching prostrate leafy downy herb with stems 30 cm long; solitary pale pink flowers 8 mm long.

Near Jabal Mershid, 40 km east of Qunfudhah; in hard sand. 50 ft.

♦ ***Tephrosia quartiniana***

A spreading leafy prostrate herb with radiating stems 30 cm long; pale pink flowers 6 mm wide with deeper coloured wings. Fairly widespread especially around Jiddah.

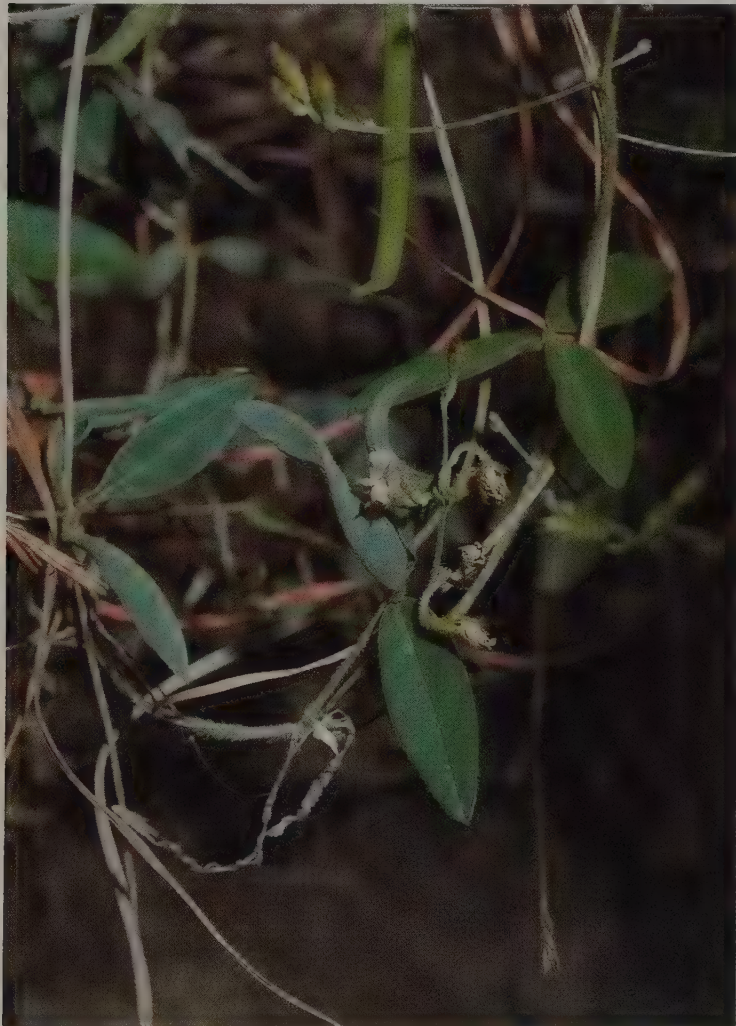
Between Dhahaban and the coast, 60 km north of Jiddah; in a fallow field near a small date grove. 30 ft.



***Tephrosia subtriflora* ◆**

A branching leafy semi-prostrate herb with stems 30 cm long; white flowers 4 mm wide.

Near Jabal Mershid, 40 km east of Qunfudhah; scrambling through grass in a shallow run-off in hard sand. 50 ft.



***Teramnus labialis* ssp. *arabicus* ◆**

A small tangled leafy vine; pale blue flowers 5 mm long; long narrow pods.

Jabal Fayfa, 100 km NE of Jizan; climbing among grass on steep rocky hill. 4,000 ft.



***Tephrosia uniflora* ssp. *petrosa* ◆**

A grazed branching woody herb 30 cm high with three and five-foliolate leaves; solitary magenta flowers 8 mm wide. Fairly widespread, especially in mountains.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; on a steep hillside near the summit of a rocky hill. 3,000 ft.



***Teramnus repens* ssp. *gracilis* ◆**

A leafy vine with slightly twining stems 1 m long; tiny pale blue flowers 3 mm long, in spikes; fairly long narrow downy pods.

Near Jabal Fayfa, 100 km NE of Jizan; on the edge of a field in the foothills. 800 ft.



Trifolium arvense ◆

A tufted leafy herb 14 cm high; tiny white flowers 1 mm long, in oval, woolly pinkish heads.

Near the head of the Grandi Lavori road, 5 km south of Baljurshi, Taif-Abha road; on a rocky hillside near the lip of the escarpment. 7,000 ft.



Trifolium fragiferum ◆

A creeping densely leafy prostrate mat-forming herb; white flowers, flushed with pink in heads 1.2 cm in diameter, the calyx becoming papery and pink-veined in fruit; similar to *T. tomentosum*.

Wadi Habaqah, 31 km south of Baljurshi on the Taif-Abha road; in damp sand by the stream. 6,200 ft.



Trifolium campestre ◆

A dense mat-forming prostrate herb; yellow flowers in spherical heads 1 cm in diameter; unscented.

Wadi Habaqah, 31 km south of Baljurshi, on the Taif-Abha road; by the edge of a stream, on a grassy bank. 6,200 ft.



Trifolium tomentosum ◆

A small prostrate leafy herb; tiny pink flowers in small heads 5 mm in diameter; the downy calyx enlarges and becomes papery and pink-veined in fruit; similar to *T. fragiferum*.

Near the head of the Grandi Lavori road, 5 km south of Baljurshi on the Taif-Abha road; on a steep rocky hillside near the lip of the escarpment. 7,000 ft.



Trigonella anguina ◆

A compact leafy herb 3 cm high; yellow flowers 2 mm long.

Wadi Habaqah, 32 km south of Baljurshi, Taif-Abha road; in damp sand by stream, in rocky shrub-filled ravine. 6,200 ft.



◆ ***Trigonella stellata***

A mat-forming leafy prostrate herb with dentate leaves; rather narrow erect yellow flowers 6 mm long, in tight clusters; clovery scent. A very widespread herb especially in the north.

Among red sandstone buttes, 20 km north of Shiqri on the road to Tabuk; in hard sand. 3,100 ft.



Trigonella hamosa* ssp. *uncata ◆

A small tufted herb with stems to 10 cm long, and dentate leaves; yellow flowers 5 mm long; sweet clover scent.

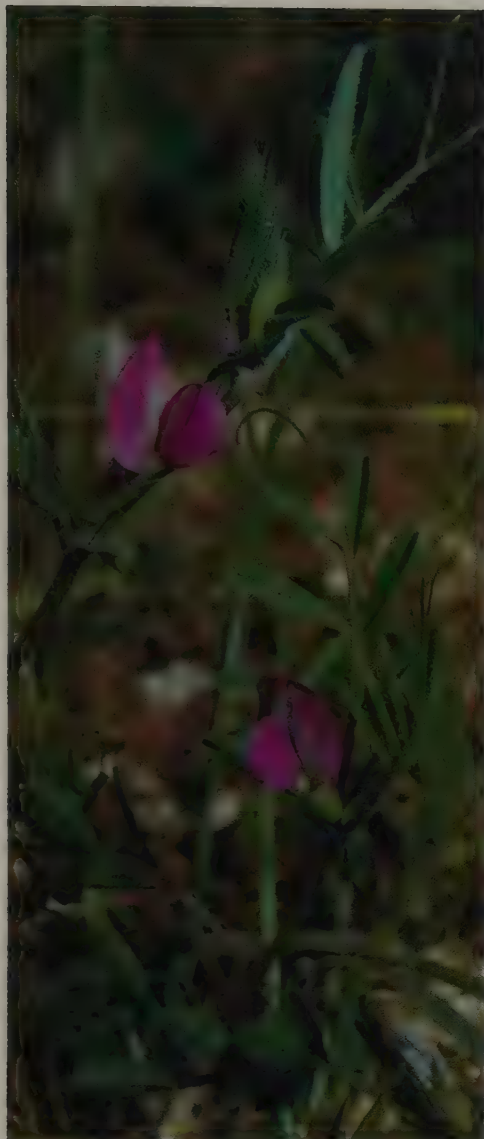
12 km west of Turayf Camp (31° 40'N, 39° 29'E); in hard sand, in claypan. 2,900 ft.



Trigonella hamosa ◆

A branching prostrate herb with stems to 30 cm long and dentate leaves; yellow flowers 5 mm long, on clusters; smooth curved pods radiating from near the tip of the flower stem.

21 km north of Qiba and 180 km north of Buraydah; in a wide claypan. 1,500 ft.



Vicia sativa* var. *angustifolia ◆

A weak-stemmed herb climbing by bi- and tri-forked leaf tip tendrils with stems to 30 cm long; deep magenta-pink flowers 8 mm wide and 1.5 cm long, the base of the standard white.

Near Al Hadda, off the Jiddah-Taif road; in fallow field near cultivated ground. 6,600 ft.



Vermifrufr abyssinica ◆

A branching prostrate herb with stems 40 cm long; small yellow flowers 2 mm wide, in flat heads. Widespread in the Asir and southern Hijaz.

Red granite mountain 15 km SW of Al Hadda, near Taif; on a rocky hillside. 7,000 ft.

Vicia sativa ◆

A sprawling leafy herb with stems to 30 cm long and leaf-tip tendrils; reddish purple flowers 1.2 cm wide with darker wings; no scent.

Between Al Bahah and Jabal Ibrahim, off the Taif-Abha road; on the edge of an exposed fallow field. 7,000 ft.





***Vicia sativa* ssp. *nigra* var. *nigra* ◆**

A weak-stemmed leafy herb climbing by leaf-tip tendrils with stems 20 cm long; rosy-lilac flowers 1.5 cm long and 6 mm wide. Fairly widespread in the Asir.

Near Al Bahah, on the Taif-Abha road; at the edge of cultivation. 7,000 ft.



***Vigna aconitifolia* ◆**

A semi-prostrate hairy leafy herb with stems to 60 cm long and deeply lobed, trifoliate leaves; yellow flowers 6 mm wide.

Near Abu Arish, 30 km SE of Jizan; in a fallow field. 500 ft.



***Vigna ambacensis* ◆**

A vine with slender stems 2 m long; pale blue flowers 1.2 cm long; long slender rounded pods.

Jabal Fayfa, 100 km NE of Jizan; by the roadside twining up herbs, at base of steep rocky hillside. 4,800 ft.



◆ *Vigna membranacea*

A very tangled leafy vine with stems over 2 m long; pale violet flowers 3 cm long with yellow mark at base of standard; no scent. Locally abundant.

Jabal Fayfa, 100 km NE of Jizan; on steep open bank below houses. 5,300 ft.

LEMNACEAE

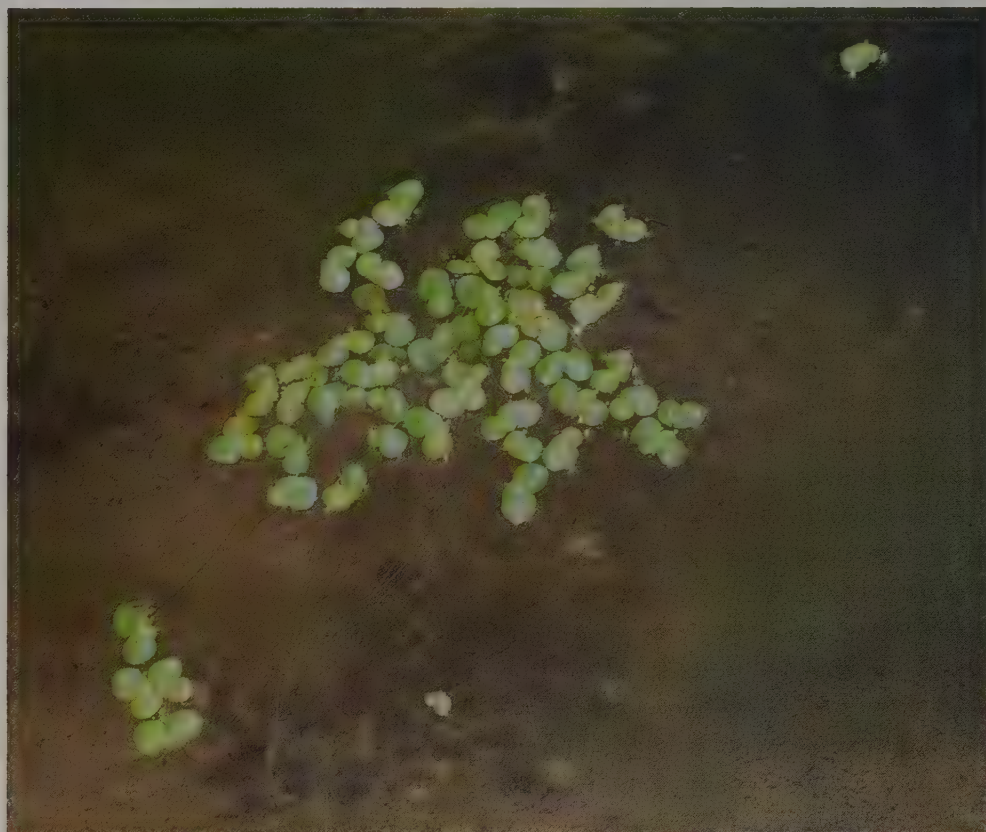
This is a small family having only six genera, but species can be found almost everywhere in still, freshwater habitats. *Lemna gibba* is relatively large and easy to see, but species of the genus *Wolffia*, the smallest known flowering plants, appear as a green scum and it is quite possible they occur in Arabia. *L. gibba* grows in colonies that almost cover the surface of a pool; each plant is

made up of a pair of circular fronds known as thalluses; these are modified vegetative bodies with no distinction between leaves and stem. The tiny naked flowers, two male and one female, are borne in an inflorescence in a pouch on the same plant; they are difficult to see with the naked eye.

Lemna gibba ♀ ♂

A small pond weed; twin, almost circular green leaves.

Tannumah, a watered valley 12 km south of An Nimas, Taif-Abha road; floating on the surface of a shallow well near the river. 6,500 ft.



LILIACEAE

None of the Arabian members of this large family resemble a conventional lily but the most striking is undoubtedly the tulip. However, few people will see this plant in the wild here because so far the only colony found has been high on Jabal Dabbagh; this was a most unexpected discovery and the fairly large population is believed to be a relict one because the present-day distribution extends from the mountains of Kurdistan across

Afghanistan to Siberia. There are, however, two other isolated populations, one on a single mountain in Yugoslavia and another on a mountain across the Red Sea in Egypt.

Most of the Arabian Liliaceae are herbs having underground storage organs, such as bulbs, or thick fleshy roots; however, the species of *Aloe* are evergreen succulents. The sepals and petals look alike and are called tepals.



◆ ***Albuca abyssinica***

A bulb with leaves to 75 cm long and flower stem to 15 cm tall; pale yellow flowers, not wide-opening, 1 cm wide and 1.5 cm long with a greenish stripe down the centre of each tepal; no scent.

One third of the way up the escarpment, Jiddah-Taif road; in crevices on a rocky hillside. 3,500 ft.



◆ ***Allium* sp. aff. *ampeloprasum*** ◆

A sparsely leafy bulb with flower stem 35 cm tall; small white flowers in oval heads 1.5 cm wide; no scent.

A red granite mountain 15 km SW of Al Hadda, near Taif; among junipers on a steep rocky hillside. 7,000 ft.





Allium pseudocalyptratum ◆

A leafy bulb with flower stem 45 cm tall; small purplish flowers in an oval head 1 cm wide and 2.5 cm long; no scent.

Tannumah, a watered valley 12 km south of An Nimas, on the Taif-Abha road; a weed in a cornfield. 6,500 ft.



Allium sinaiticum ◆

A sparsely leafy bulb with flower stem 10 cm tall; small green and white flowers in an oval head 2 cm wide.

10 km north of Shiqri on the road to Tabuk; among sandstone buttes, in drifted red sand. 1,300 ft.



Allium* sp. aff. *rothii ◆

A bulb with two broad dark green leaves flat on the ground and a short flower stem 4 cm long; pale green flowers 1.5 cm wide with darker stripe down each tepal and purple anthers, in spherical heads; no scent. Very local and scarce.

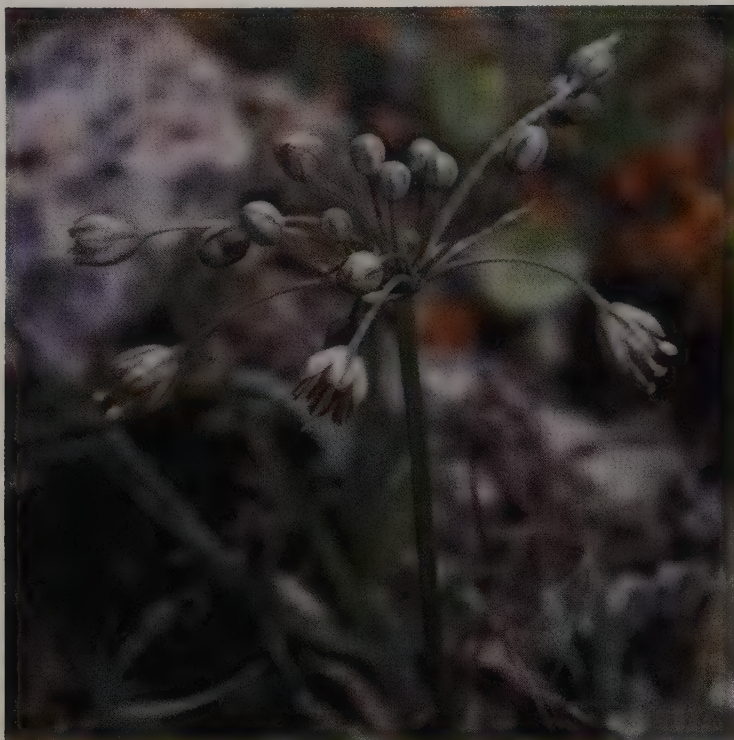
Turayf Camp, NE of Turayf; in drifted sand over limestone plateau. 2,900 ft.



Allium sindjarens ◆

A sparsely leafy bulb with flower stem 10 cm tall; upward-facing pinkish fawn flowers 5 mm long on long pedicels; strong garlic smell when crushed. Easily overlooked as the flowers blend with the stony desert.

Near Zabirah, 200 km north of Buraydah; in drifted sand near a bauxite outcrop. 1,800 ft.



Allium stamineum ▲

A sparsely leafy bulb with flower stem 9 cm long; pinkish fawn flowers 4 mm wide on long pedicels, in an open nodding head; strong garlic smell when crushed.

Jabal Qutn, 15 km NE of Uqlat as Suqur, off the Madinah-Qassim road; in crevices in the lower part of a large granite outcrop. 3,000 ft.

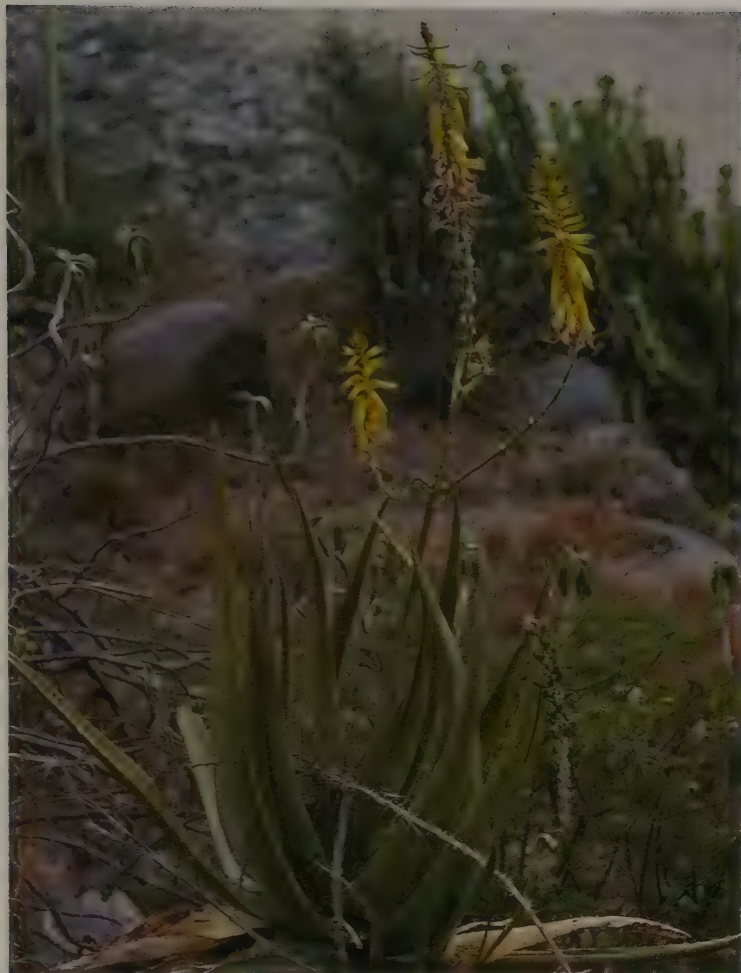


***Allium* sp. 2504** ▲ ▼

A leafy-based bulb with flower stems to 1 m long; purple flowers 6 mm wide in a globular head 6 cm wide, those at the crown opening and setting seed before the lower flowers; strong musky odour.

Near Zabirah, 200 km north of Buraydah; among red sand dunes. 1,800 ft.





Aloe castellorum ◆

A spiny-leaved succulent plant with narrow bright green leaves occasionally flecked with white; widely spaced white teeth tipped with chestnut brown; three- and four-branched erect flower stem 1.5 m long with bright yellow flowers 3 cm long.

Jabal Fayfa, 100 km NE of Jizan; among rocks near the crest of a ridge. 5,300 ft.



Aloe fleurentinorum ◆

A spineless succulent-leaved plant, sometimes forming colonies, with purplish slightly twisted leaves and erect branching flower stem 45 cm long; pink flowers 3 cm long, in a short almost capitate head.

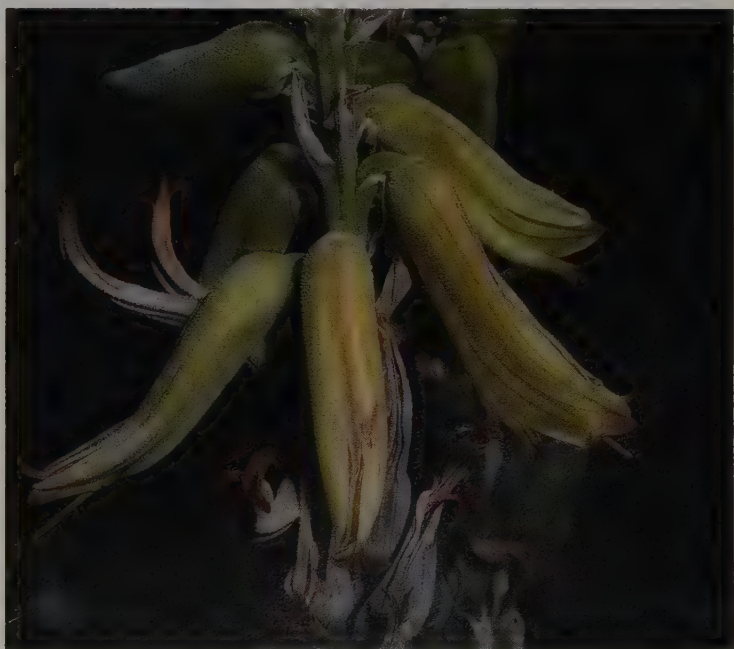
Jabal Abu Hassan, a sandstone-capped massif off the escarpment between Abha and Najran; on the summit plateau. 5,500 ft.



Aloe* sp. aff. *niebuhriana ◆◆

A spiny-leaved succulent plant with erect branching flower stems to 1 m long; pale red flowers 4 cm long with green stripes when in bud; a yellow colour form has slightly downy flowers. Locally common.

Wadi al Uss, on the western slope of Jabal Sawdah SW of Abha, 25 km below the Police Post; among river boulders. 2,500 ft.

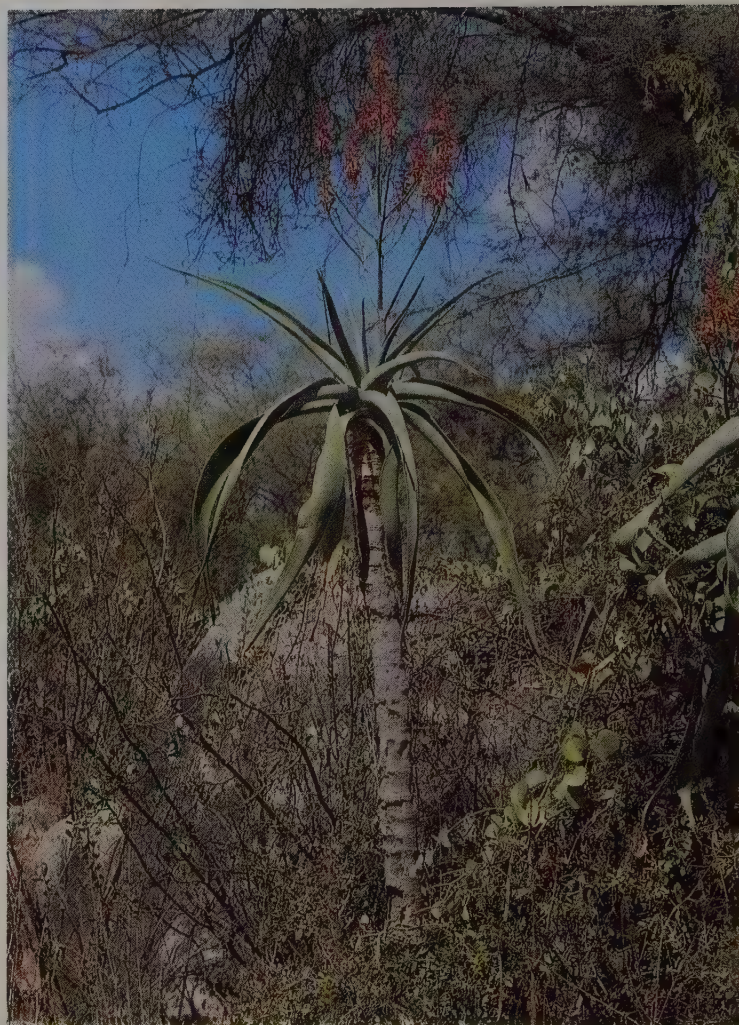




Aloe rubroviolacea ◆◆

A large succulent spiny-leaved plant up to 1.25 m in diameter, the leaves blue-green with a purplish margin; the short thick stems are prostrate or often half-pendent with upward-curving flower stem; crowded red flowers 3 cm long with exserted stamens and style; orange sap. Young plants sometimes grow in crowded groups with slender pendent stems and white-splashed blue-grey leaves.

Jabal Sawdah, 28 km NW of Abha; on sandstone cliffs at the lip of the escarpment. 9,200 ft.



Aloe sabaea ◆◆

An erect grey-stemmed plant 2 m tall, the succulent leaves short-spiny and the branching flower stem 60 cm long; pale red flowers 3.5 cm long.

5 km SW of Muhayl on the road to Ad Darb; among volcanic boulders and shrubs on an old raised river bank. 1,200 ft.





◆ *Aloe* sp. aff. *scobinifolia*

A succulent-leaved herb with pale green thick rough leaves having very few small teeth, either near the base or at the apex; flowers not seen; dead few-branched flower stems very short, barely clearing the leaves. This

plant suckers freely and grows in colonies, unlike the solitary *Aloe sheilae* from near Bishah.

Jabal Auf, 80 km SSW of Madinah; on very steep rocky hillside. 4,500 ft.



◆ *Aloe sheilae* ◆

A succulent plant with thick rough leaves similar to *A. fleurentinorum* but having occasional teeth; flower spikes to 1 m high, two to three per plant and each carrying two to four semi-capitate heads, but occasionally seven; deep pinkish red flowers 3.5 cm long, the corolla tipped with green, carried on arching pedicels 1.5 cm long and subtended by bracts 7 mm long. Winter flowering, November to January.

A granite mountain 83 km ESE of Al Bahah and 72 km west of Bishah; in crevices among tumbled boulders, very exposed. 5,300 ft.





***Aloe* sp. aff. *tomentosa* ◆◆**

A succulent spiny-leaved plant, sometimes forming colonies, with erect sparsely branching flower stem to 1 m long; densely white-hairy creamy flowers 3 cm long with pale green stripes. Locally widespread.

Near Suq al Ithnayn, 58 km SE of Abha; on a sandstone plateau. 7,900 ft.



***Aloe* *vacillans* ◆◆**

A spiny succulent-leaved plant with chocolate-brown teeth and glaucous leaves, the flower stems 1 m long with four or five branches; orange-red flowers 2.5 cm long, in a fairly open inflorescence. Autumn flowering. In scattered localities round Tannumah and Abha.

Behind the buildings, Abha University; on a rocky hillside. 6,200 ft.





◆ *Aloe* sp. nov. aff. *vacillans* ◆

A spiny-leaved succulent plant with bright pale green leaves edged with distinctive chocolate-brown teeth; flower stems 1.5 m long with two or three branches; yellow flowers 3 cm long, closely pressed to the stem; clear sap. Locally common.

Between Al Bahah and Baljurshi, Taif-Abha road; on a rocky hillside. 7,000 ft.



◆ *Aloe vera* var. *officinalis*

A spiny-leaved succulent plant suckering to form large colonies, with single or sparsely-branched erect flower stems 1 m long; red or yellow flowers 3 cm long and 6 mm wide; no scent. Orange sap. Very widespread in the lowlands south of Makkah.

Jiddah-Muhayl-Jizan road, near its junction with the Grandi Lavori road; among scrub on a wide sandy plain. 1,200 ft.



***Aloe* sp. 2219** ◆ ◆

A spiny-leaved succulent plant with slightly glaucous leaves edged with widely spaced white teeth; flower stems to 1 m tall with up to 40 branches; pendent bright red flowers 4.8 cm long with exserted stamens having dark purple filaments; orange sap. Perhaps the most beautiful *Aloe* in Saudi Arabia. Also occurs on high granite mountains near Madinah.

Near Sha'aib, 75 km SW of Taif; on rather barren steep rocky hillside above semi-permanent water. 5,500 ft.

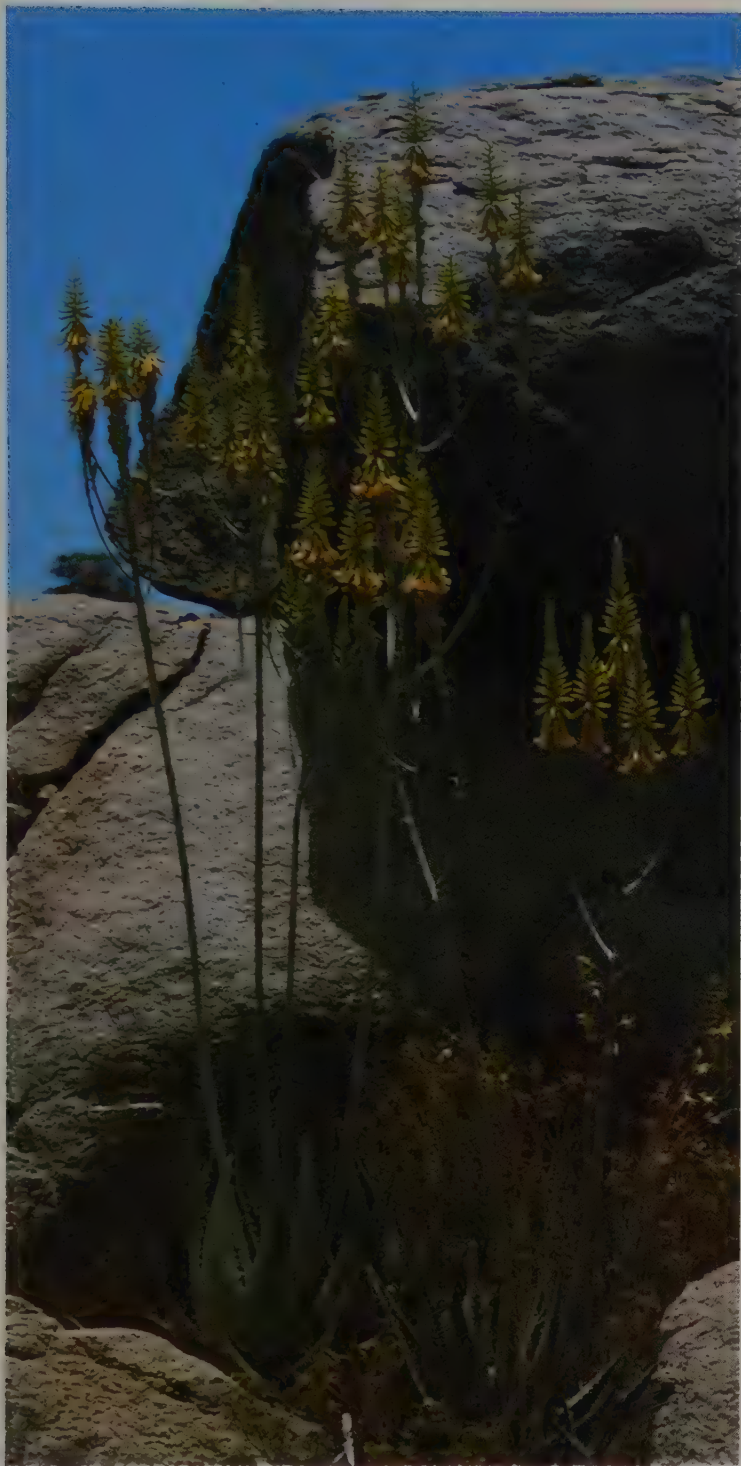


***Aloe* sp. 3525 (sp. 'C.' of J.R.I. Wood)** ◆ ◆

A spiny succulent-leaved plant with fairly widely spaced brownish teeth and many-branched flower stem 1 m tall; very white-woolly pale cream flowers 4.5 cm long, with pale green stripes; large woolly fruits. Widespread locally.

Jabal Fayfa, 100 km NE of Jizan; on steep vegetated hillside. 4,800 ft.





***Aloe* sp. 3738** ◆◆

A spiny-leaved succulent plant with slightly glaucous leaves and widely spaced creamy teeth occasionally tipped with brown; erect branching flower stems to 2 m tall; yellow flowers 3.5 cm long; orange sap. Summer flowering. All plants, in scattered colonies in the locality, had yellow flowers.

Near Shafa viewpoint, SW of Taif; among granite boulders. 6,800 ft.



***Aloe* sp. 4329** ◆

A spiny-leaved succulent plant, the densely tufted stems 8 cm long and the thick rounded bright green leaves having white flecks; flowers not seen.

Near the head of the Grandi Lavori road; in a crevice of a granite pinnacle. 6,500 ft.





◆ ***Asparagus africanus***

A branching thorny vine 4 m long with tiny feathery leaves; white flowers 7 mm wide; sweet scent. Very widespread in the Asir and southern Hijaz, usually climbing.

Near Suq al Ithnayn, 58 km south of Abha; on the lip of the escarpment, growing through a juniper. 7,900 ft.

◆ ***Asparagus flagellaris*** ◆

A densely tangled thorny dome-shaped shrub to 3 m tall with tufts of fairly long leaves; flowers not seen; orange fruits 5 mm wide. This plant never attempts to climb even when under trees in spite of its strong thorns. Locally widespread.

Farasan Island, west of Jizan; in shallow runnels in fossil coral. 30 ft.



◆ ***Asparagus aphyllus* var. *stipularis***

A branched spiny shrubby herb 30 cm high; delicate pale yellow flowers 8 mm wide; faint scent. Fairly widespread in mountains but nowhere abundant.

Jabal Dabbagh, a 7,500 ft. granite massif 88 km SW of Tabuk; on a northwestern spur. 5,500 ft.

◆ ***Asparagus falcatus***

A branched intensely thorny woody herb with stems to 1 m long and erect leaves all facing in one direction. Flowers not seen.

Jabal Abu Hassan, a sandstone massif off the edge of the escarpment between Abha and Najran; on the summit plateau. 5,500 ft.





Asphodelus sp. aff. *aestivus* ◆◆

A tall sparsely branched leafy-based herb 30 cm high; white flowers 2 cm wide with a central crimson stripe down each tepal; no scent. Locally very widespread.

Al Hadda, on the Jiddah-Taif road; in hard sand. 6,200 ft.



Asphodelus fistulosus ◆◆

A small leafy-based herb 8 cm high; white flowers 9 mm wide with a deep red stripe down the centre of each tepal; no scent. An extremely widespread herb everywhere, usually in sand-pans.

Low rocky hills, 10 km east of Jiddah; in hard sand. 50 ft.





◆ ***Asphodelus refractus***

A sparsely leafy herb with lax branching stems to 35 cm tall; widely spaced white flowers 8 mm wide with a reddish line down the centre of each tepal; the ripe fruit hangs downward on a long pedicel. Locally abundant, but easily overlooked because the stems are reddish.

Near Zabirah, 200 km north of Buraydah; in drifted red sand. 1,800 ft.



◆ ***Bellevalia flexuosa***

A bulb with three or four broad dark green leaves and short flower spike; greenish white tubular flowers 1 cm long and 7 mm wide, the tips of the corolla lobes recurved; purple anthers; no scent. Very local, in small scattered groups.

Turayf Camp, NE of Turayf; in drifted sand over limestone plateau. 2,900 ft.



◆ ***Colchicum* sp. aff. *ritchii***

A bulb with fairly large lilac flowers 4 cm wide carried on stems 2 cm long; no scent. A smaller white form grew nearby. Nearly always three-leaved. Locally abundant.

Jabal Az Zudh, between Wadi Sawawin iron-ore deposit and Ash Sharmah; on a very barren east-facing col. 4,000 ft.





◆ *Dipcadi viride*

A bulb with a few (usually three) short broad, often twisted, shiny leaves; erect flower stem 10 cm tall with usually green flowers 1 cm wide, the outer three tepals much longer than the inner three. Very widespread in the Asir and southern Hijaz.

Between Suq al Ithnayn and Khamis Mushayt, SE of Abha; among boulders in a granite outcrop. 7,000 ft.



◆ *Drimia maritima* ◆◆

A very large bulb, leafy in the spring; the solitary flower spike 2 m long appears in the summer after the leaves have died; white flowers 1.7 cm wide; the three-angled fruits are 1 cm long. Locally common.

5 km north of Baljurshi, Taif-Abha road; on the dividing bank of a field. 6,500 ft.



◆ *Dipcadi serotinum*

A bulb with a few (usually two) long narrow leaves; flower stem half recumbent, 18 cm long; narrow greenish brown flowers 1.5 cm long; no scent. Widespread in the north.

Among red sandstone buttes, 14 km east of Shiqri, off the Tabuk road; in drifted sand. 3,100 ft.





Gagea reticulata ◆ ◆

A small herb with long slender leaves and bright yellow flowers 2.5 cm wide on stems 10 cm long; no scent. Very widespread in the north and found twice in the southern mountains.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; on a northwestern spur. 5,500 ft.



Merendera abyssinica ◆ ◆

A bulb with several leaves; pale pink flowers 4 cm wide on short stems. The fruit forms below ground and emerges as it ripens. Winter flowering. Widespread in the Asir and southern Hijaz.

Near the Police Post at the top of the Jiddah-Taif road; among rocks at the lip of the escarpment. 6,200 ft.





Tulipa biflora ◆◆

A bulb with several rather long wavy-edged leaves and flower stems 10 cm tall; white, wide-opening flowers 6 cm wide with circular deep yellow throat, the tepals flushed with lilac and green on the underside; strong sweet scent.

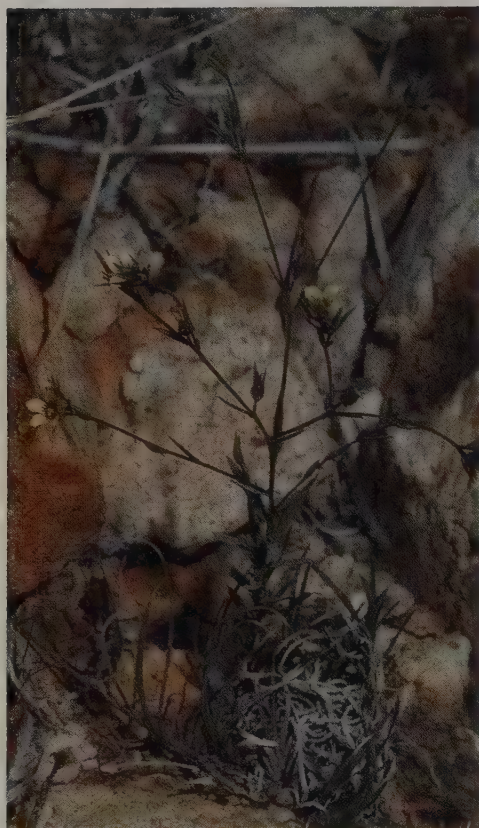
Jabal Dabbagh, a 7,500 ft granite mountain 88 km SW of Tabuk; on a northwestern spur. 5,700 ft.



LINACEAE

The two tiny ephemeral species occurring in Saudi Arabia grow chiefly under junipers in the southern mountains, and they bear only a superficial resemblance to the economically

important, large, blue-flowered *Linum usitatissimum*, which produces flax and linseed. The family is distributed over much of the world, but the genus *Linum* is chiefly Mediterranean.



◆ ***Linum corymbulosum***

An erect branching slender-stemmed herb 10 cm tall with a few narrow leaves; pale yellow flowers 5 mm wide; no scent. Locally widespread in the Asir and southern Hijaz and easily confused with *L. trigynum*.

Red granite mountain 15 km SW of Al Hadda, Jiddah-Taif road; on a rocky hillside. 7,000 ft.



◆ ***Linum trigynum*** ▲

A slender erect sparsely-branched leafy herb 12 cm tall; bright yellow flowers 5 mm wide. Very widespread in the Asir and southern Hijaz and easily confused with *L. corymbulosum*.

Tannumah, a watered valley 12 km south of An Nimas on the Taif-Abha road; in sand, among granite boulders. 6,500 ft.

LOGANIACEAE

The two members of this family are found chiefly in the southern mountains, one is a shrub and the other a tree. The *Buddleja* sufficiently resembles the commonly grown garden plant *B. davidii* to be easily recognized, and it has the same

strong honey scent that makes it so attractive to butterflies. *Nuxia* is also strongly scented but the round flat cyme of flowers is very unlike the spike-like cyme of *Buddleja*.



◆ ***Buddleja polystachya***

A large bushy leafy shrub 5 m high; orange-brown flowers 3 mm wide, in spikes; sweet scent. In scattered localities in the southern mountains, the leaf size and habit somewhat variable.

Near Jabal Sawdah, on the Abha-Taif Ring Road; near cultivation, on the bank of a stream. 8,500 ft.

For the most common form of *B. polystachya* see top left hand plate of opposite page.



Buddleja polystachya ◀



Nuxia oppositifolia ◀

A very leafy many-branched tree 10 m tall with rather narrow dentate leaves; creamy flowers 4 mm wide with long exserted stamens, in cymes; very sweet scent.

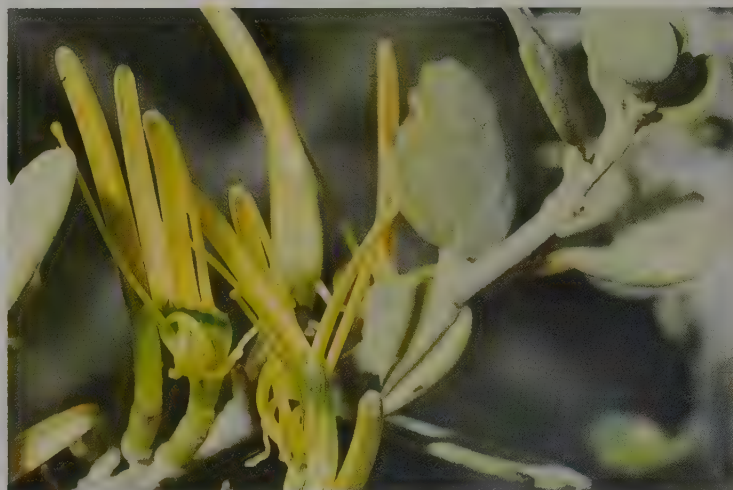
Halfway down the Grandi Lavori Road, 5 km south of Baljurshi; in a wooded ravine. 4,000 ft.

LORANTHACEAE

All six species in Saudi Arabia are parasites on the branches of trees, *Acacia* being the favoured host; the exception seems to be *Oncocalyx schimperi*, which the author has found chiefly on *Maerua crassifolia* and *Monothea buxifolia*. Other favoured host plants are *Ziziphus spina-christi* for *Phragmanthera* sp. aff. *rufescens* and *Capparis decidua* for *Plicosepalus acaciae*. *Phragmanthera* sp. aff. *rufescens* grows so large and the plants are sometimes so numerous on a single tree that it swamps its host's identity with its large dark green leaves.

There is often a large outgrowth where the parasite's root enters the host tissue, but in *P. acaciae* external roots also run for a short distance along the branches before plunging into the host. The leafless *Viscum schimperi* is reminiscent of a red-berried form of the European mistletoe, *V. album*.

All the species considered here, with the exception of *Viscum schimperi*, have in the past been placed in *Loranthus*: this genus has now been split into a number of smaller genera.



◀ *Oncocalyx schimperi* ◀

A bushy-branching leafy parasite with stems to 60 cm long and three-nerved round leaves; erect three-petalled yellow flowers 2.5 cm long, the curved filaments grouped together.

Between Taif and Al Bahah on the Abha road, before the ascent up Jabal Shumruk; on a *Maerua crassifolia* 7 m high. 6,300 ft.



◆ *Phragmanthera* sp. aff. *rufescens* ▼

A very large-leaved bushy-branching parasite with stems to 1 m long; clusters of erect downy brownish yellow flowers 3 cm long, having petals grouped like the fingers of a hand and the greenish anthers curving over the 'palm'; no scent. Very widespread in the Asir and south Hijaz on various host plants but usually acacia.

Near Suq al Ithnayn, 58 km SE of Abha near the lip of the escarpment; on an acacia 2 m high. 7,900 ft.



◆ *Plicosepalus acaciae*

A parasite with a few stems 1 m long and oval leathery leaves; fleshy green flowers 3.5 cm long, aging bright scarlet with very curled back petals and protruding stamens. Widespread in the north on several species of host plants but mostly acacia.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; on an acacia in a rocky ravine on the road to Shiqri. 2,200 ft.

◆ *Plicosepalus curviflorus* ▼

A slender-stemmed sparsely branching parasite with narrow grey-green leaves; deep red curved flowers 3.5 cm long, creamy-orange at the base and having slender spreading petals. Widespread on acacias, mainly south of Makkah. Autumn flowering.

Wadi Fatimah, 15 km SE of Jumum; in the crown of an acacia 4 m high. 1,000 ft.





Tapinanthus globiferus ◆◆

A bushy leafy woody-stemmed parasite with stems 1 m long; tubular creamy flowers aging crimson 3.5 cm long and 5 mm wide, the petals crimson tipped; no scent. Summer flowering.

Wadi al Uss, on the western side of Jabal Sawdah near Abha, 8 km below the Police Post; on the branches of *Ficus salicifolia*. Also observed on *Commiphora* sp. 3,000 ft.



Viscum schimperi ◆

A many-branched succulent green-stemmed parasite with stems to 75 cm long; fleshy yellow flowers 3 mm wide; the ripe orange berries 8 mm in diameter. Occurs in scattered localities between Taif and Najran.

Wadi Wejj, 25 km SW of Taif; on the lower branches of an acacia 7 m high. 6,800 ft.



LYTHRACEAE

The two shrubs, *Woodfordia* and *Lawsonia* (which produces the dye henna), are very different in appearance from the herbaceous *Ammannia* and *Lythrum*. It is not certain if henna grows truly wild in Saudi Arabia, or if an apparently wild plant

is an escape from cultivation. Both shrubs will grow on rocky hillsides as well as in hard sand, but the herbaceous species all grow in damp places.



Lawsonia inermis ◆◆

An erect densely branched bushy leafy shrub 3 m high; creamy flowers 5 mm wide, in large panicles; sweet scent. In scattered localities, sometimes apparently wild in the mountains of the Asir and near Jabal Fayfa.

Near Suq al Ahad, 35 km east of Qunfudhah; on a sandy bank near cultivation. 35 ft.



Ammannia baccifera ◆

An erect sparsely branching leafy herb 30 cm tall with rounded stem and usually alternate long narrow leaves; tiny round reddish fruits 3 mm wide. Flowers not seen.

Wadi Kharar, near the foot of the escarpment, Jiddah-Taif road; in damp sand in a steep rocky ravine. 1,500 ft.



Ammannia auriculata ◆

An erect leafy square-stemmed branching herb 60 cm high, the base of the arrow-shaped opposite leaves clasping the stem; bright rosy-lilac flowers 5 mm wide; no scent.

35 km SE of Mudhaylif on the Jiddah-Jizan road; in wet sand by a small stream. 1,000 ft.





Lythrum hyssopifolia ◆

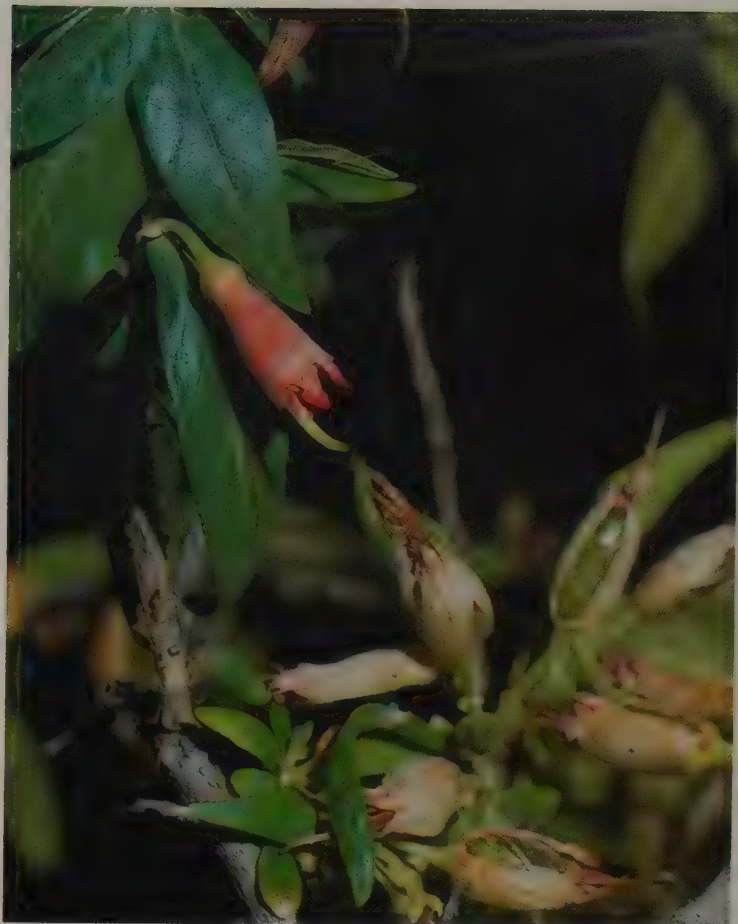
A prostrate spreading herb with crowded leaves and reddish stems 35 cm long; lilac-pink flowers 4 mm wide; no scent.

Tannumah, a watered valley 12 km south of An Nimas, Taif-Abha road; in damp sand in the river-bed. 6,500 ft.

Woodfordia fruticosa ◆

A very leafy sparsely branching shrub to 2.5 m tall with narrow pointed leaves aging scarlet; red tubular flowers 1 cm long and 5 mm wide; no scent; oval fruits enclosed in a persistent papery calyx.

Grandi Lavori road, between Baljurshi and Namrah (Jiddah-Jizan road); in a steep ravine 500 ft. above the road. 5,000 ft.



MALVACEAE

Many of the species in this family have attractive flowers, but all are short lived, usually lasting less than a day. *Abutilon* and *Senra* have a very similar appearance when not in flower, but whereas the *Abutilon* species flower in the late afternoon, usually after 3 p.m., *Senra* opens at dawn and wilts by noon. Most species are found south of Makkah, only *Abutilon bidentatum*, *Althaea ludwigii*, and *Malva parviflora* being at all common in the north.

◆ ***Abutilon bidentatum***

A leafy shrub 1 m high; yellow flowers 3 cm wide, opening at 4 p.m.; no scent. A widespread and variable plant; three of the more extreme forms are described.

Jabal Manfah, 50 km NNW of Najran, Abha road; among acacias on a sandy plain. 6,200 ft.





◆ ***Abutilon* sp. aff. *bidentatum* 1149**

An erect leafy shrub nearly 1 m tall with very soft-downy deeply serrated leaves; yellow flowers 2.5 cm wide. Flowers in late afternoon.

Halfway down the escarpment, Jiddah-Taif road; on a rocky hillside. 4,000ft.



◆ ***Abutilon* sp. aff. *bidentatum* 1471** ◆ ◆

A small velvety-leaved grazed shrublet 30 cm tall; pale yellow flowers 1.5 cm wide facing upward on long hair-like pendent pedicel; no scent. Flowers in late afternoon. Locally fairly abundant.

On the Abha-Najran road, 45 km south of Zahran; in a crevice of a limestone outcrop. 6,200 ft.



◆ ***Abutilon figarianum***

An erect leafy shrub to 1.25 m high; deep yellow flowers 3 cm wide. Flowers in late afternoon. Locally widespread.

Low rocky hills, 10 km east of Jiddah; in hard sand. 80 ft.





***Abutilon* sp. aff. *bidentatum* 1486** ◆

A weak-stemmed shrub 1.5 m tall with downy greyish leaves; yellow flowers 1.2 cm wide on very short pedicels; no scent. Flowers in late afternoon.

Jabal Manfah, 50 km NNW of Najran-Abha road; climbing through a bush among acacias on a sandy plain. 6,200 ft.



◆ ***Abutilon muticum*** ◆

An erect many-stemmed leafy shrub to 1.25 m high; apricot-yellow flowers 3.5 cm wide with deep crimson centre. Flowers in late afternoon. Locally very widespread.

Low rocky hills, 10 km east of Jiddah; in hard sand. 80 ft.



Abutilon fruticosum ◆

Erect sparsely branched shrub to 1 m high with silvery downy leaves; yellow flowers 2.5 cm wide; no scent. Flowers in late afternoon.

Low rocky hills, 10 km east of Jiddah; among rocks. 80 ft.



Althaea ludwigii ◆

A leafy prostrate herb with stems to 45 cm long and deeply lobed palmate leaves; white flowers 5 mm wide; no scent. Locally widespread.

Near Uqlat as Suqur, off the Madinah-Qassim road; on salt-flats near the village. 2,800 ft.



Cienfuegosia welshii ◆

A grazed leafy woody shrublet 45 cm high with dark green palmate leaves; pale yellow flowers 3.5 cm wide with deep crimson centre, the petals spotted with crimson. Long pale green oval fruits, also spotted with crimson. Locally widespread but difficult to find in flower due to overgrazing.

42 km NNW of Najran, on the Abha road; among tumbled granite boulders. 6,200 ft.



Hibiscus* sp. aff. *aponeurus ◆

An erect straggly leafy shrub 1 m high with fairly large downy leaves; pale pink flowers 1.5 cm wide; no scent. Locally fairly abundant.

Halfway up the escarpment, Jiddah-Taif road; on a rocky hillside. 4,000 ft.



Hibiscus deflersii ◆

An erect leafy straggly shrub 1 m high with bright green leaves; dark crimson-red flowers 3 cm wide; no scent. A widespread plant at medium altitudes in the south but nowhere very abundant.

Halfway up the escarpment, Jiddah-Taif road; on a rocky hillside. 4,000 ft.

◆ ***Gossypium hirsutum* var. *punctatum***

A leafy woody herb 45 cm high; pale creamy-white flowers 5 cm wide; an escape from cultivation.

Near the new Jiddah Airport on the Madinah road, Jiddah; in a shallow sandy ditch. 20 ft.



Hibiscus micranthus ◆

A grazed bushy leafy shrub 45 cm high; white flowers 8 mm wide; no scent. The round pea-sized fruit capsules are very distinctive. A very widespread plant, the flowers are sometimes borne on long pedicels and have reflexed petals.

Jabal Manfah, 50 km NNW of Najran, on the Abha road; in a wide sandy wadi. 6,200 ft.



Hibiscus somalensis ◆

A grazed semi-prostrate woody herb with stems to 25 cm long; bright scarlet flowers 8 mm wide; no scent. Fairly widespread locally.

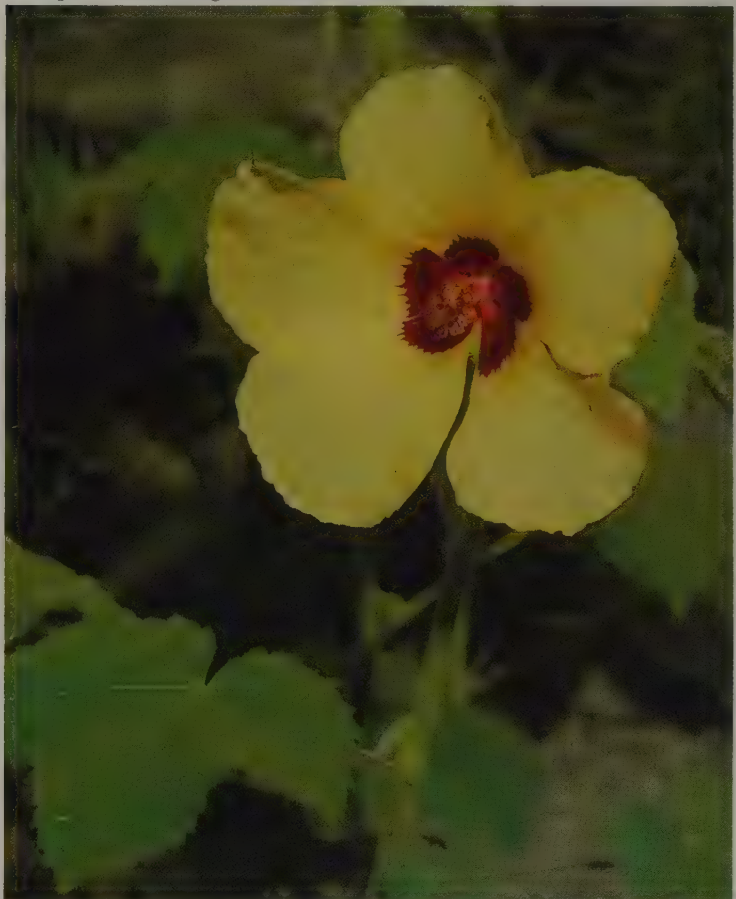
A limestone outcrop between Abha and Najran, 45 km south of Zahran; in a rock crevice. 6,200 ft.



Hibiscus trionum ◆

An erect branching leafy herb 20 cm high; creamy flowers 2.6 cm wide with deep purplish red centre; early morning flowering. The brown-ridged papery sepals enlarge to enclose the fruit. A weed.

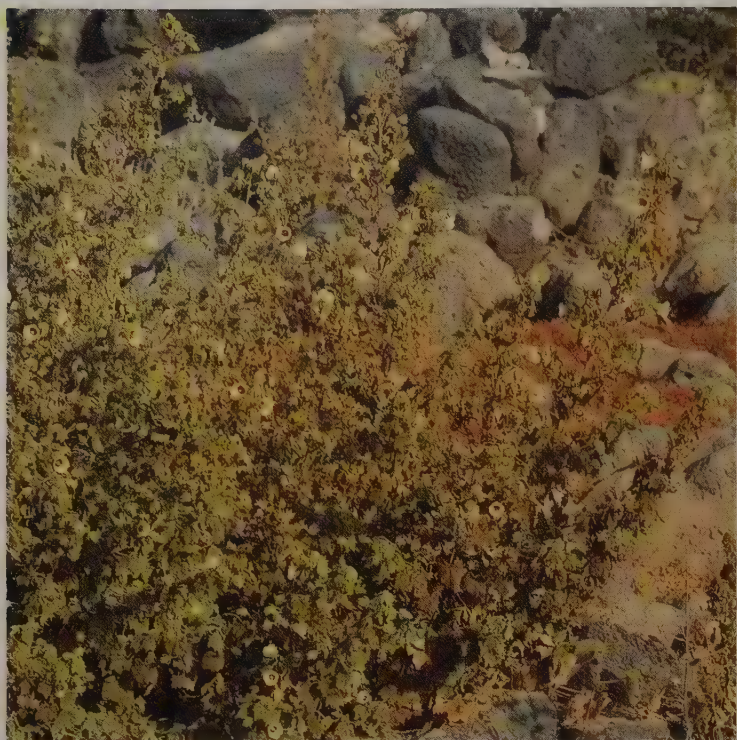
Najran; in an irrigated cornfield. 4,500 ft.



Hibiscus vitifolius ◆

An erect sparsely branching leafy herb 75 cm high; nodding pale yellow flowers 6 cm wide with deep purplish centre; no scent. A fairly widespread plant in the south.

Off the Abha-Jizan road, halfway down the escarpment; in a rocky ravine. 4,500 ft.



***Kosteletzkyia* ? sp. nov. ◆◆**

An erect leafy spire-shaped herb to 75 cm tall with oily glandular palmately veined leaves, the margins coarsely dentate; pale yellow flowers 2 cm wide with speckled reddish purple centre. Morning flowering.

12 km north of Muhayl road junction, Jizan-Qunfudhah road; among lava blocks under an acacia near the sea. 5 ft.



***Malva neglecta* ◆**

A low branching leafy herb with stems to 20 cm long; white flowers tinged with pink, 2.3 cm wide; no scent.

Jabal Sawdah, 28 km NW of Abha; under junipers on the lip of the escarpment. 9,200 ft.



***Malva verticillata* ◆**

An erect branching leafy herb with stems to 60 cm long; pale pinkish flowers 1 cm wide with dark pink stripes; no scent. Locally common.

Jabal Sawdah, 28 km NW of Abha; among rocks near a stream at the lip of the escarpment. 9,200 ft.



Malva parviflora ◆

Erect leafy herb to 50 cm tall; very pale pink flowers 6 mm wide; a widespread and variable herb; usually prostrate.

Najran; a weed in an irrigated wheatfield. 4,500 ft.

Pavonia arabica ◆

An erect sparsely branching herb 20 cm tall with silvery downy oval leaves; pale pinkish flowers 8 mm wide, cupped in a small calyx and with a large spidery epicalyx.

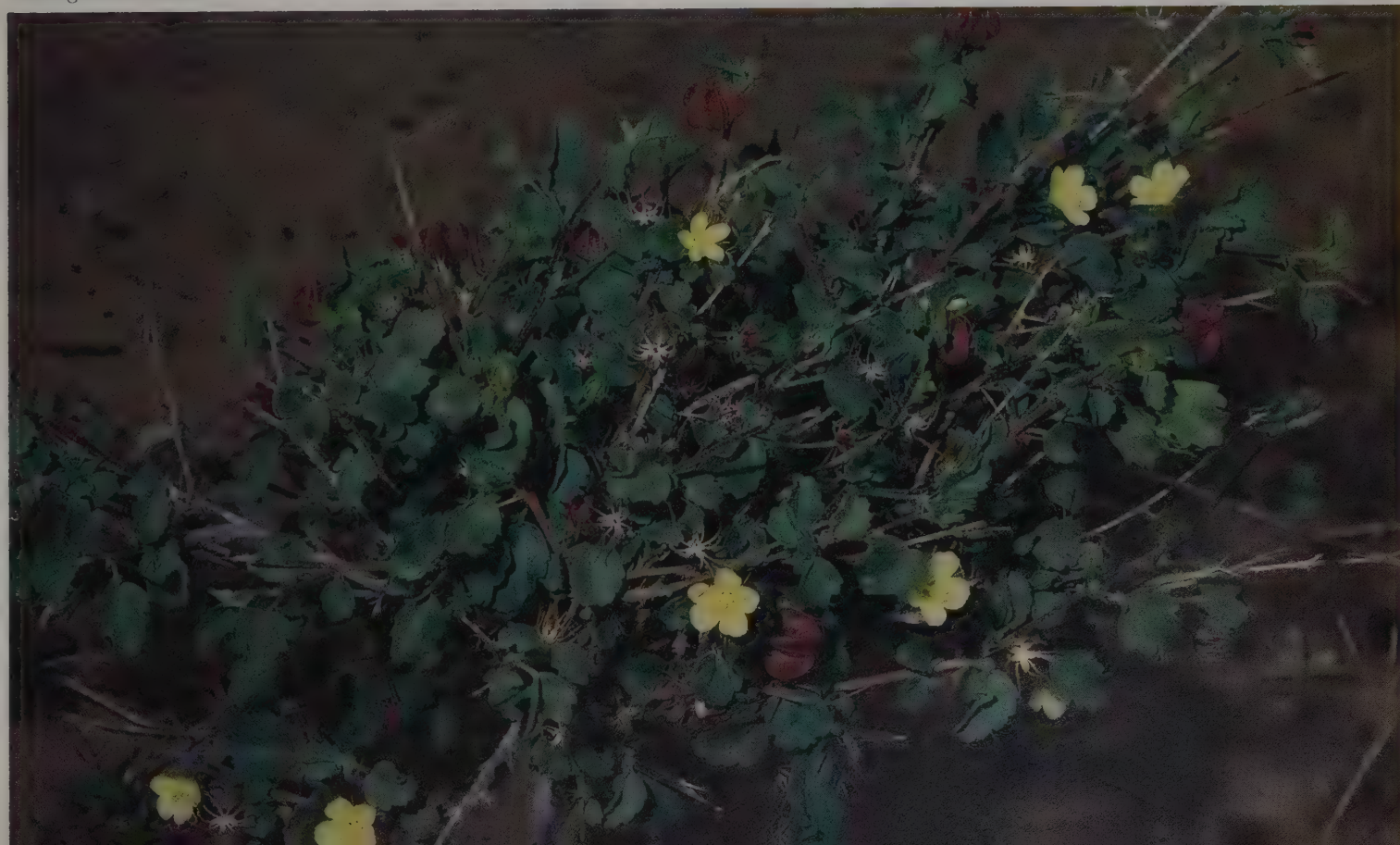
12 km north of Muhayl road junction, Jizan-Qunfudhah road; among lava blocks under an acacia near the sea. 5 ft.



Pavonia kotschy ◆

A bushy leafy shrublet 35 cm tall; pale yellow flowers 8 mm wide, subtended by slender spidery bracts; no scent. The reddish calyx enlarges to enclose the fruits.

Al Lith road, 35 km from its junction with the Makkah By-Pass; among rocks. 100 ft.





Pavonia patens ◆

A very leafy slender-stemmed shrub 45 cm high with slightly lobed dentate leaves; deep yellow flowers 2 cm wide, the green flower-like calyces enlarging fruit; no scent. Evening flowering. Easily confused with *Abutilon bidentatum*, among which it grows.

Jabal Fayfa, 100 km NE of Jizan; in rocky gully among shrubs at foot of mountain. 3,500 ft.



Pavonia triloba ◆ ◆

An erect leafy herb 60 cm high; pale pink flowers 8 mm wide subtended by slender spidery bracts; no scent. Fairly widespread in the lowlands south of Al Lith.

Jabal Mershid, 40 km east of Qunfudhah; among small shrubs. 50 ft.





Senra incana ◆ ◆

A grazed branching downy-leaved herb 45 cm high; deep purplish red flowers 3.5 cm wide, opening at dawn and lasting only a few hours; no scent.

Jiddah-Jizan road, 10 km from the Al Quz road junction; in the shade of acacias lining a shallow wadi. 1,000 ft.



Sida ovata ◆

A shrubby woody-based leafy herb with stems to 45 cm long and broadly oval leaves; orange-yellow flowers 1.5 cm wide; no scent. Evening flowering.

North of the Al Quz junction, Jiddah-Jizan road; on the fringe of cultivation. 1,050 ft.



Sida spinosa ◆

An erect leafy herb 22 cm tall with narrow dentate leaves and small soft-spiny stipules in the leaf axils; yellow flowers 1 cm wide. Afternoon flowering.

Near Jabal Fayfa, 100 km NE of Jizan; in a fallow field among the foothills. 700 ft.

MELIACEAE

This is the family of the true mahoganies and other high-quality timbers, and though *Trichilia emetica* is not used for its timber its seeds contain oils which, in parts of Africa, are used in making soap. In Saudi Arabia this species occurs only near the Yemen where it is found growing on the rocky banks of

rivers that flow most of the year. Another species *Azadirachta indica* is widely planted in towns as a shade tree and is particularly popular in Jiddah. It has not been included in this book because the author has never found it growing wild.



Trichilia emetica ♀

A very leafy tree 7 m tall with wide crown, the walnut-like leaves with brown tomentum on the underside; pale green flowers 1.8 cm wide with reflexed petals; sweet scent.

Near Jabal Fayfa 100 km NE of Jizan; on the bank of a wadi near Suq Ayban. 1,000 ft.

***Trichilia emetica*; fruits** ♀



MENISPERMACEAE

This family contains the species that is one of the sources of the famous arrow poison curare; several other species have medicinal properties. However, the species occurring commonly in Arabia seem harmless enough, at least to animals, as the young shoots are often grazed. The genus *Cocculus* is a large one extending from North America, Mexico, Africa, and India across into Indomalaysia; many species are huge climbing vines.

Cocculus hirsutus ♀

A small vine with stems to 3 m long and with very downy oval leaves; in bud.

Jabal Fayfa, 100 km NE of Jizan; climbing through a shrub on rather exposed rocky hillside. 5,200 ft.





◆ *Cocculus pendulus* ◆

A stout white-stemmed leafy vine with tangled stems many metres long; greenish flowers 3 mm wide; flattened fruits, deep red when ripe, in groups of two or three; no scent. A very widespread plant and somewhat variable.

Wadi Fatimah, 35 km from Jumum; in hard sand, scrambling through acacias. 800 ft.

MORACEAE



Most laymen would recognize the *Ficus* species of Arabia as being figs, even the tiny fruits of *F. salicifolia* reveal their identity when cut in half, but the dwarf *Dorstenia foetida* has a very strange inflorescence. Although both genera have a milky latex and very small unisexual flowers borne on the same or separate plants, the flowers are arranged in heads in hollow receptacles in *Ficus* and in a flattened head in *Dorstenia*.

◆ *Dorstenia foetida*

A small squat leafy succulent-stemmed plant, the 'trunk' 6 cm wide usually wedged in a rock crevice; milky juice when cut; flat greenish inflorescence 1.5 cm wide, including the rays; foul smell. Fairly widespread south of Makkah but easily overlooked unless in leaf.

Jabal an Nabah, in the headwaters of the Wadi Hali, 80 km SE of Qunfudhah; in a shady rock crevice. 3,000 ft.



Ficus carica ♣

A shrub or tree to 5 m tall, the fairly large dentate leaves either lobed or entire; small deep purple ripe fruits, sweet and edible. Widespread, especially in the southern mountains and somewhat variable.

Near Al Bahah; on the rocky bank of a small field. 7,000 ft.



***Ficus carica* forma** ♣

An erect bushy leafy shrub 1.25 m high with entire small dentate leaves; the small purplish ripe fruits are edible and grow from the young branches.

Among red sandstones buttes north of Shiqri on the Tabuk road; in drifted sand. 3,100 ft.



Ficus* sp. aff. *glumosa* var. *glaberrima ♣ ♣

A leafy branching shrubby tree 10 m tall; milky juice; the young red-flushed figs are crowded along the young branches.

Wadi Kharar, a ravine in granite near the foot of the escarpment, Jiddah-Taif road; growing out of a cliff. 1,500 ft.





Ficus ingens ◀

A wide leafy branching tree 5 m high; figs growing from the young stems. Fairly widespread, usually on cliffs, in the Asir and southern Hijaz.

Wadi Habaqah, 31 km south of Baljurshi on the Taif-Abha road; growing from the steep bank of a watered ravine. 6,200 ft.



Ficus salicifolia ◀

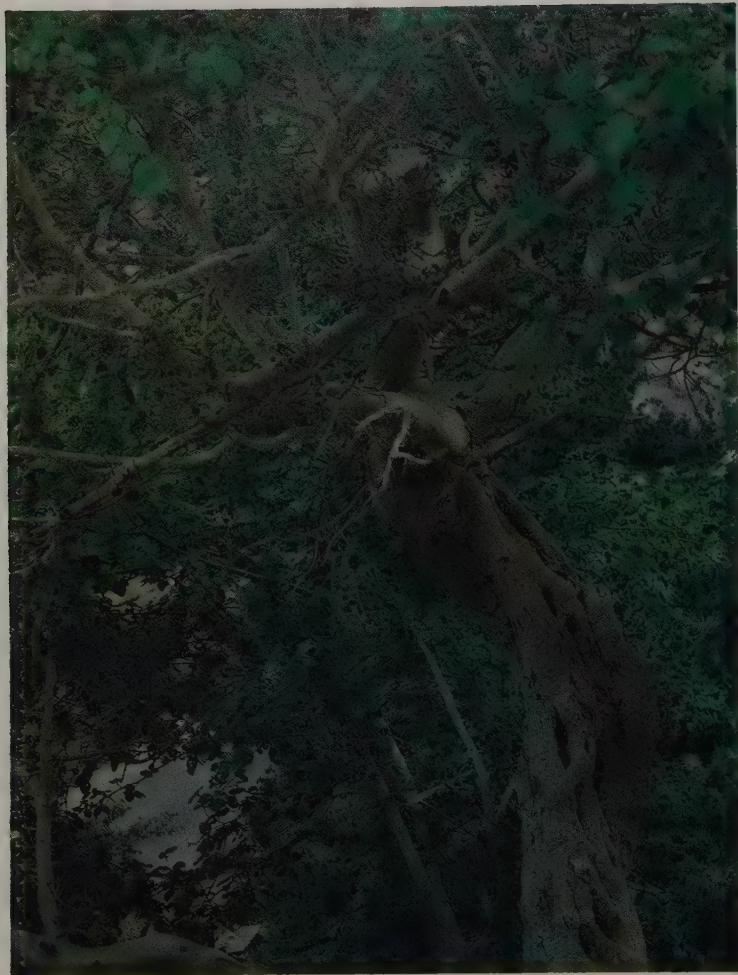
A many-branched bushy leafy tree 4 m tall; small round figs clustered at the tips of the young branches. A very widespread, slightly variable plant; sometimes the foliage is pleasantly scented.

Near Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; among rocks at the edge of a wadi. 2,000 ft.

◆ ***Ficus populifolia***

A bushy wind-pruned tree 5 m tall with pale trunk and shiny cordate leaves having pale veins; tufts of thin dark brown adventitious roots hanging from trunk and branches at intervals; spherical fruits 1 cm wide, green flushed red.

Farasan Island, Seir district; in short steep ravine in fossil coral. 20 ft.



◆ *Ficus sycomorus* ◆

A large stout leafy tree 23 m high; the small figs grow in clusters on slender stems growing from the trunk and main branches; no scent. Fairly widespread in the Asir and southern Hijaz.

Wadi Zaymah, between Taif and Makkah, on the eastern road; at the edge of cultivation. 1,800 ft.



◆ *Ficus vasta* ◆

A stout creamy-trunked leafy tree 5 m high with very large cordate leaves; the hairy figs are clustered along the apex of the stems.

The lower reaches of Wadi al Uss, on the western slope of Jabal Sawdah NW of Abha; near cultivation in the river valley. 2,500 ft.

MORINGACEAE

This family is small and has a limited distribution from Africa to western India with only one genus and perhaps a dozen species. The sole species found in Saudi Arabia is a most beautiful small tree; it has a fairly wide range in the mountains, but it is difficult to observe as it grows on cliffs and in steep

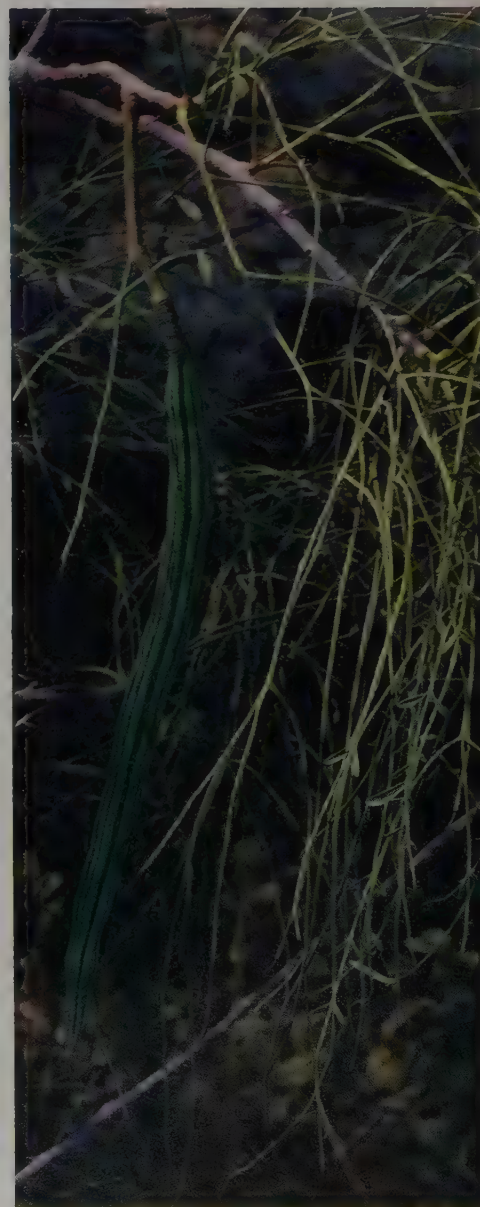
rocky places, usually out of the reach of grazing stock. The long slender seed pods resemble those of members of the Leguminosae, and indeed this family is considered to be a link between that and Capparaceae.



◆ ***Moringa peregrina*** ◆

A slender tree with arching branches and long needle-like leaves with tiny flat leaflets; pale pink flowers 2 cm wide flushed with deep pink, in panicles; faint sweet scent. A fairly widespread though not abundant tree.

Near Wadi Turabah, between Taif and Al Bahah; growing from a cliff. 5,500ft.



MYRICACEAE

Although this is a small family of only two genera, it nevertheless has a world-wide distribution, and all species are aromatic trees or shrubs. *Myrica salicifolia* has been collected in the Yemen, and it is surprising that the single collection from Saudi Arabia has been found so far north. The flowers are

unisexual and are usually borne on axillary catkin-like spikes, male and female on the same plant. The author could, however, find only male flowers though one of the two other trees observed higher up the ravine may have had female flowers.



◆ ***Myrica salicifolia*** ◆

A spreading very leafy tree with dark green leaves; greenish yellow bud-like male flowers in tassels 2 cm long; balsam-like aromatic scent.

Grandi Lavori road, between Baljurshi and Namrah (Jiddah-Jizan road); in steep ravine 500 ft. above the road. 5,000 ft.

MYRSINACEAE

Neither genus found in Arabia bears much resemblance to the other, though each is found in the high southern mountains. In *Myrsine* the small unisexual flowers are found on separate

plants on spurs in the axils of the small leaves. In *Maesa* the leaves are large, and the bisexual flowers are in a terminal panicle.



Maesa lanceolata ◆

A leafy pollarded tree 3 m high; creamy-white flowers 6 mm wide, in panicles; faintly scented.

Tannumah, a watered valley 12 km south of An Nimas, Taif-Abha road; near the stream. 6,500 ft.



Myrsine africana ◆◆

An erect leafy shrub 2 m high; tiny crowded crimson bud-like flowers 1 mm wide; no scent. In scattered localities from Abha southwards.

Jabal Sawdah, 28 km NW of Abha; among rocks on the lip of the escarpment. 9,200 ft.



MYRTACEAE



This family includes the lofty *Eucalyptus* tree, but the sole member in Saudi Arabia is a small slender-stemmed shrub. Although there were several thickets of the plant, the author has found *Myrtus communis* in only one locality, Jabal Dabbagh; this mountain seems renowned for the number of Mediterranean species found there. In March the plants were in fruit so they probably flower in late summer.



◆ ***Myrtus communis*** ◆

A wide bushy leafy shrub 3 m high with slender branches and aromatic foliage; dead white flowers 1.3 cm wide; dark purplish fruits with a bluish bloom.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; in a ravine. 5,500 ft.

NYCTAGINACEAE

It is hard to believe that the showy *Bougainvillea* with its coloured bracts and which is grown in many Arabian gardens, is a member of the same family as *Boerhavia* and *Commicarpus*,

both common over much of the desert. These are herbs, though *Commicarpus* scrambles through bushes and, when protected from grazing, makes a large plant.



◆ ***Boerhavia coccinea* var. *viscosa***

A branching prostrate herb with very sticky stems 15 cm long; deep magenta flowers 2 mm wide, in tightly clustered heads. A fairly widespread plant, especially by the roadside.

Low rocky hills, 10 km east of Jiddah; in hard sand. 80 ft.



Boerhavia elegans ▲

An erect branching delicate-stemmed herb with a leafy base; single tiny pink flowers 2 mm wide. This plant, which looks like a *Gypsophila*, is easily overlooked.

Najran; by the roadside. 4,500 ft.



Boerhavia repens ▲◆

A prostrate glabrous herb with stems to 20 cm long; magenta flowers 3 mm wide, in tightly clustered heads. A very variable plant; the flowers are sometimes pale pink in loose heads.

15 km south of Jabal Abu Hassan, a sandstone massif off the edge of the escarpment SW of Abha; in damp sand by a stream. 3,000 ft.



Commicarpus grandiflorus ▲

A dense tangled leafy bushy herb 60 cm high and 1.5 m wide with thick very sticky leaves; rosy-lilac flowers 6 mm wide. Fairly widespread in the southern mountains.

Halfway up the escarpment, Jiddah-Taif road; among rocks. 5,000 ft.





Commicarpus helenae ◀

A weak-stemmed leafy herb scrambling through bushes with stems to 1.25 m long; pale rose-lilac flowers 3 mm wide. A fairly widespread, somewhat variable plant.

Wadi Fatimah, near Jumum; at the edge of cultivation. 500 ft.



Commicarpus plumbagineus ◀

A tangled weak-stemmed herb scrambling over bushes 3 m tall; white flowers 5 mm wide with prominent lilac filaments. Fairly widespread in the Asir and southern Hijaz.

Wadi Zaymah, between Taif and Makkah, on the eastern road; at the edge of cultivation. 1,800 ft.



Commicarpus sinuatus ◀

A weak-stemmed herb with ivy-like leaves and stems 1 m long; rosy-lilac flowers 6 mm wide with long pink filaments.

Jabal Manfah, 50 km NNW of Najran on the Abha road; scrambling through bushes, on a sandy plain. 6,200 ft.



Commicarpus squarrosus ◀

A weak-stemmed herb with oval leathery leaves; deep magenta flowers 5 mm wide with short filaments.

Jabal Manfah, 50 km NNW of Najran; scrambling through bushes, among sandstone rocks. 6,200 ft.

OCHNACEAE

The author has found only a single plant of this family in western Saudi Arabia, and it was not in flower, though the brilliant red calyx, characteristic of the genus, could be mistaken for a flower. *Ochna inermis* is quite common in Africa and has greenish yellow flowers borne in a raceme. The calyx is free and becomes fleshy in fruit, and the corolla has five contorted petals.

◆ ***Ochna inermis*** ◆

A leafy shrub with arching stems; in fruit; the red flower-like calyxes that surround the green and black fruits are along the underside of the branches.

Halfway down the escarpment, Abha-Jizan road; growing from a cliff. 4,000 ft.



OLEACEAE

The olive and jasmine, members of the same family, belong to different subfamilies and are very different in appearance. In *Olea* the silvery leaves are simple and the flowers tiny, but in *Jasminum* the dark green leaves are pinnate and the tubed corolla is large with four to twelve lobes.

◆ ***Jasminum grandiflorum* var. *floribundum*** ◆

A leafy weak-stemmed shrub with stems 3 m long; white flowers 2 cm wide flushed with pink behind the petals; sweet scented. A very widespread, somewhat variable plant.

Wadi Habaqah, 31 km south of Baljurshi, Taif-Abha road, scrambling through bushes on a rocky hillside. 6,200 ft.





◆ *Olea europaea* ssp. *africana* ◆

An erect bushy-crowned grey-green leafy tree 5 m high; white flowers 5 mm wide, in panicles; sweet scent; glossy purplish-black sweet-tasting fleshy fruits 1 cm long. Widespread in scattered localities from Madinah southward and often pollarded for firewood.

Wadi Habaqah, 31 km south of Baljurshi, Taif-Abha road; on a rocky hillside. 6,200 ft.

ONAGRACEAE

Onagraceae, with eleven genera and a cosmopolitan distribution, has most species occurring in North America. The single species found in Saudi Arabia grows mainly in damp sand near semi-permanent water in the high Asir; because it flowers in the late summer, a visit in early spring will give no hint of its presence.

Epilobium hirsutum ♀

An erect branching very leafy herb 1 m tall; deep rosy-pink flowers 1.3 cm wide; no scent.

Tannumah, 12 km south of An Nimas, Taif-Abha road; in damp sand by the stream. 6,500 ft.



OPHIOGLOSSACEAE

Ophioglossaceae is a curious family of ferns with four genera and about seventy species in the tropics and temperate regions. *Ophioglossum polyphyllum* which occurs in Saudi Arabia, has its fertile organs clustered in a spike arising from one leaf-like frond and well deserves its common name 'adder's tongue'.

Ophioglossum polyphyllum ♦

A tiny erect two- or three-leaved herb with fruiting spike 2 cm high; easily overlooked. Fairly widespread in hard sand in the mountains.

Suq al Ithnayn, 58 km SE of Abha; on a sandstone plateau. 7,900 ft.



ORCHIDACEAE

This is a huge family world-wide having about 18,000 species; these are adapted to all but the most extreme of environments. Only three species have so far been found in Saudi Arabia and the author has found two; one is so small it is easily overlooked and the other is large by any standards. Many orchids are epiphytes and live on trees, but the Arabian species are ground orchids and each is adapted to periods of drought with

specialised nutrient and water-storage organs. In *Holothrix arachnoidea* this organ is an underground tuber, whereas in *Eulophia petersii* clusters of large conical modified stems called pseudobulbs are found above ground. In most orchids the lip is the distinctive feature of the flower, coming in many shapes, sizes and colours, and in *E. petersii* it is lobed, brightly coloured and has raised keels.





Eulophia petersii ◆◆◆

Large pale cream crowded pseudobulbs 15 cm high topped by leaves 40 cm long, two or three to a young pseudobulb; flower stems arising from the base of a pseudobulb, arching, sparsely branched, 1.5 m long, with many flowers; sepals and petals green and brown, rolled back at the tip; lip and side-lobes white, the former with pink keels; sweetly scented. A very beautiful plant. Fairly widespread in scattered localities west of the escarpment and south of Baljurshi.

Summit of Jabal Abu Hassan, a sandstone massif, off the edge of the escarpment, between Abha and Najran; in the protection of bushes. 5,500 ft.



◆ ***Holothrix arachnoidea***

A tiny herb with an underground tuber and with two leaves pressed flat on the ground; a single flower stem to 15 cm high with many purplish-brown flowers 4 mm wide; no scent. Fairly widespread along the escarpment in the Asir and southern Hijaz, always in shade.

Near Suq al Ithnayn, 58 km SE of Abha; in the shade of a large boulder at the lip of the escarpment. 7,900 ft.

OROBANCHACEAE

This is a family of total parasites that almost entirely lack green colouration and whose leaves are reduced to scales; it is fairly closely related to the Scrophulariaceae, many members of which are semi-parasitic and whose flowers have much in common. Some species parasitise only one host species; others will parasitise members of a particular family, while yet others

will accept several families. It is extremely difficult, when the vegetation is mixed, to be sure which is the host plant because the parasites grow on the fine roots of their host some distance away; however, the large Arabian species, *Cistanche phelypaea*, seems to favour species of *Hammada* (Chenopodiaceae).



Cistanche phelypaea ◀

A stout leafless spike of flowers 30 cm high; deep yellow flowers 2 cm wide; faintly scented. A very widespread plant from Makkah northward.

Alongside the new Jiddah Airport, on the Madinah Road; in a shallow sandy ditch, parasitic on the roots of *Hammada salicornica*. 20 ft.



Cistanche tubulosa* forma *albiflora ◀

A very stout-stemmed root parasite with erect spike to 35 cm tall; white flowers 1.5 cm wide; sweet scent. Locally fairly abundant.

Near Jabal Ibrahim off the Taif-Al Bahah road; in a narrow sandy wadi, parasitic on *Tamarix* sp. 6,800 ft.

◆ *Orobanche caucasica*

An erect spike 16 cm high; pale blue flowers 2 cm long and 1.5 cm wide with a white throat; slightly scented.

Near Zabirah, 200 km north of Buraydah; among red sand dunes, parasitic on *Calligonum comosum*. 1,800 ft.



◆ *Cistanche violacea* ◆

A stout-stemmed spike to 22 cm tall; white flowers 1.5 cm wide with deep royal-purple corolla lobes and yellow anthers; sweet scent. Locally abundant.

Thaniyat Camp, near Turayf; in hard sand, perhaps parasitic on either *Atriplex leucoclada* or *Astragalus spinosus*. 2,725 ft.

◆ *Orobanche aegyptiaca*

An erect spike 13 cm long; dark blue flowers 2.5 cm long and 1.5 cm wide with a white throat. Fairly widespread around Riyadh northwards.

Near Zabirah, 200 km north of Buraydah; in hard sand in vegetated wadi, usually parasitic on *Horwoodia dicksoniae*. 1,800 ft.





***Orobanche cernua* var. *cernua* ◆◆**

An erect spike to 14 cm high; crowded flowers 1 cm long and 6 mm wide, the narrow creamy corollas tipped with purple; no scent. Very widespread especially in the north.

Near Zabirah, 200 km north of Buraydah; in drifted red sand. A root parasite on a variety of hosts but especially members of the Solanaceae such as *Lycium*. 1,800 ft.



***Orobanche cernua* var. *desertorum* ◆**

An erect spike 12 cm high; crowded pure white flowers 1.2 cm long and 6 mm wide; no scent.

20 km N of Qiba and 180 km north of Buraydah; in a shallow sandy wadi at the edge of the limestone plateau. A root parasite on *Rhanterium eppaposum* (Compositae). In scattered localities, always on *Rhanterium*, on limestone. 1,500 ft.



***Orobanche cernua* var. *latebracteata* ◆**

An erect spike 20 cm long; narrow flowers 1 cm long and 7 mm wide, the creamy corollas tipped with dark blue.

70 km SE of Abha, along new road to the escarpment; on edge of wheat field, host plant not established. 7,000 ft.



Orobanche minor ◆

Slender erect spikes 15 cm high, sometimes branched below ground; flower colour variable, white flushed with purplish, each flower 7 mm wide; no scent.

Tannumah, a watered valley 12 km south of An Nimas; probably parasitic on junipers. 6,500 ft.



Orobanche mutellii* var. *angustiflora ◆

A slender erect spike, sometimes branched below ground, 10 cm high; blue and white flowers 6 mm wide; no scent.

Between Jabal Ibrahim and Al Bahah, off the Taif-Abha road; in hard sand of fallow field near lip of scarp, parasitic on *Rumex nervosus*. 7,000 ft.



Orobanche ramosa ◆

An erect spike 5 cm high; pale bluish lilac flowers 8 mm wide with a white throat; no scent.

A red granite mountain 15 km SW of Al Hadda, Jiddah-Taif road; on a rocky hillside, parasitic, probably on junipers. 7,000 ft.



Orobanche oxyloba* var. *oxyloba ◆

An erect spike 10 cm long; blue and white flowers 7 mm wide; no scent. Similar to *O. mutellii* but the spike is stouter and the flowers slightly hairy.

The waterfall beauty spot between Abha and Jabal Sawdah; in a rocky crevice, probably parasitic on *Rumex nervosus*. 8,500 ft.

OXALIDACEAE



The single wild species in Saudi Arabia, *Oxalis corniculata*, is widespread, especially in the southern mountains, and it has a range of habitats from rocky hillsides to the grassy banks of fields; flower size and habit of growth vary considerably. To the layman the trifoliate leaves are similar to those of clover (Leguminosae), but the fruit is an erect capsule and not a pod.

◆ ***Oxalis corniculata***

A spreading prostrate herb, often with reddish leaves and with stems 14 cm long; yellow flowers 8 mm wide; erect, grooved seed capsules. A very widespread, somewhat variable plant.

Near Al Hadda, off the Jiddah-Taif road; among rocks. 6,800 ft.

PALMAE

Three palms grow wild in Saudi Arabia; *Phoenix dactylifera* is the date palm, and though these palms are found all over Arabia, even in groups of two or three in tiny terraces on steep hillsides, they were with one exception tended by man and were

probably planted by him. *P. caespitosa* grows in small ravines and on dry rocky hillsides especially in the southern mountains, and its small fruits are only 1.8 cm long, with a thin sweet edible flesh.





Phoenix dactylifera ◆

A single-trunked palm 7 m tall with very spiny fronds 2 m long; dead flowers on small flower sprays. This population was not cultivated.

At the coast 100 km north of Jizan; on tidal flats near a freshwater seepage. Sea level.



Phoenix caespitosa ◆◆

A usually stemless palm with fronds 2 m long, growing in colonies; bushy yellow-stemmed flower spikes; tiny fruits, dark brown when ripe. Fairly widespread in the Asir and southern Hijaz.

60 km south of Baljurshi, on the Taif-Abha road; on a rocky hillside. 6,500 ft.



◆ ***Hyphaene thebaica*** ◆

A fairly tall-trunked palm 8 m high, sometimes branched; untidy fan-like fronds, the dead ones persistent; angled reddish brown shiny fruits 6 cm long. Fairly widespread near underground streams, especially towards the coast.

Near Hanakiyah, 30 km east of Madinah; in wide sandy wadi. 2,500 ft.





PANDANACEAE

The apparently wild groves of *Pandanus*, found mainly in the south near Jizan, were probably originally introduced into the country from the Far East or from Africa because the leaves are sometimes used to make baskets or matting. The author has never found the species in either flower or fruit.

◆ *Pandanus odoratissimus* ◆

A many-stemmed leafy tree to 10 m tall, the toothed leaves appear to grow spirally up the stem as the stem is twisted; growing in groups. Sterile. The pendent fruit looks like a pineapple.

Al Aridah, near the Yemen border, SE of Jizan; in the sandy river-bed. 800 ft.



PAPAVERACEAE

Many members of this family grow in the north; only *Argemone*, *Fumaria* and *Papaver dubium* occur occasionally in the south, usually as weeds. Most authorities place *Fumaria* and *Hypocymus* in a separate family, Fumariaceae, and the flowers are certainly very different from those of the 'poppies'. In *Fumaria* the tube-shaped flowers are very complex, but in the poppies, *Argemone*, *Glaucium*, *Papaver* and *Roemeria*, the regular flowers have four large free petals, which are usually crumpled in the bud.

◆ *Argemone mexicana*

A branching prickly herb 35 cm high; deep yellow flowers 3 cm wide; no scent. Common in scattered localities in the escarpment foothills of the southern mountains, always below 3,000 ft. Naturalized; of New World origin.

Wadi al Uss, NW of Jabal Sawdah, between the Police Post and Muhayl; in the stony river-bed. 2,500 ft.



***Argemone ochroleuca* ◆**

A branching prickly herb to 35 cm high; pale yellow flowers 3 cm wide; no scent. A common wayside herb in the high southern mountains and extending down to 1,300 ft near Makkah By-Pass. Naturalized; of Mexican origin.

Near Taif; in hard sand. 5,500 ft.



***Fumaria parviflora* ◆**

A branching leafy green herb 10 cm high; narrow white pink-tipped flowers 4 mm long, in small heads; no scent. A fairly widespread weed.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; on a northwestern spur. 5,500 ft.



***Glaucium arabicum* ◆**

A branching leafy green herb 10 cm high with blue-green glaucous leaves; scarlet flowers 4 cm wide with purple centre; no scent; long slender seed pods.

Near Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk, at the foot of the escarpment on the road to Tabuk; in a gravelly wadi. 2,200 ft.



***Hypecoum* cf. *geslinii* ◆**

A leafy herb with finely divided leaves and branching stems to 14 cm long; yellow flowers 5 mm wide with two large petals and two small petals; no scent. Fairly widespread in the north.

Among red sandstone buttes 10 km north of Shiqri on the road to Tabuk; in drifted sand. 3,000 ft.



◆ *Hypecoum pendulum*

A slender erect herb with stem 15 cm high arising from a basal rosette of finely divided leaves; pendent yellow flowers 5 mm wide with two large petals 5 mm long and two small petals; no scent.

A granite valley in the Jabal Ash Shati range, between Ash Sharmah and the Wadi Sawawin iron-ore deposit; in coarse sand. 4,000 ft.



◆ *Papaver dubium* var. *laevigatum* ◆

A slender hairy-stemmed herb 30 cm tall with smooth leaves; pale scarlet flowers 3 cm wide; no scent. In scattered localities in the southern mountains.

5 km SW of Al Hadda, near Taif; a rocky hillside near the lip of the escarpment. 6,000 ft.

◆ *Papaver dubium* sensu lato

An erect leafy herb 45 cm high; scarlet flowers 4 cm wide with an oval blackish mark at the base of each petal.

Near the summit of Jabal Sawdah, 28 km NW of Abha; at the edge of cultivation. 8,900 ft.



Papaver glaucum ◆ ◆

A dwarf herb with a basal rosette of lobed blue-green glabrous leaves and flower stem 9 cm tall; very deep red flowers 4 cm wide with small dark patches in the throat open all day; short conical capsule with a large cap. Widespread especially round Turayf Camp.

180 km SSW of Turayf Camp; in shallow sandy wadi in lava flow. 2,300 ft.



***Papaver* sp.** ◆

A slender erect herb 25 cm high with smooth pale green glaucous leaves; fragile pale scarlet flowers 2 cm wide, open only for a short time in the morning; no scent. Long oval capsule with a small cap.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; in a valley on the southwestern side. 1,400 ft.





◆ ***Roemeria hybrida***

A tiny grazed herb 4 cm high; deep purple flowers 2 cm wide; no scent; long slender seed pods. Fairly widespread in the north.

A granite valley in the Jabal Ash Shati Range, between Wadi Sawawin iron-ore deposit and Ash Sharmah; in damp sand near a stream. 4,000 ft.

PASSIFLORACEAE

Many members of this family are vines, and several species produce the luscious fruit known as Passion fruit, but *Adenia venenata* is difficult to associate with those vines. It is a strange swollen-trunked tree with shiny green bark and a large tuft of slender drooping branches growing from the apex; with imagination it can resemble a fat woman with long hair. When growing under trees the branches grow up towards the crown

and can reach 7 m or more in length. It must not be confused with the other Arabian swollen-trunked tree, *Adenium obesum* (Apocynaceae) though the generic name is similar and both species may often be found in nearby localities, though seldom growing together. *Adenia* is the only genus in the family whose regular flowers are unisexual and borne on separate plants.



◆ ◆ ***Adenia venenata***

A smooth green-barked swollen-trunked tree 1.5 m high; slender drooping branches 2 m long with a few lobed palmate leaves; fleshy creamy flowers 1.2 cm wide; pale green papery-skinned oval fruits 5 cm long netted with dark green veins; faint sweet scent.

Halfway down the escarpment, on the road between Abha and Jizan; on a steep, rather barren rocky hillside. 3,500 ft.



PEDALIACEAE

Sesamum indicum is native to tropical Asia and is widely cultivated for its seeds, which are used in confectionery and yield sesame oil. It is often grown in the lowlands in the south of western Saudi Arabia and the sole collection made was almost certainly an escape, perhaps growing from seeds thrown from the tyres of a passing car.

***Sesamum indicum* ♦**

An erect leafy herb 24 cm high; white tubular flowers 2 cm wide with faint crimson speckles in the throat; no scent.

The new Jiddah Airport on the Madinah road, Jiddah; in hard sand of a shallow ditch. 50 ft.



PLANTAGINACEAE

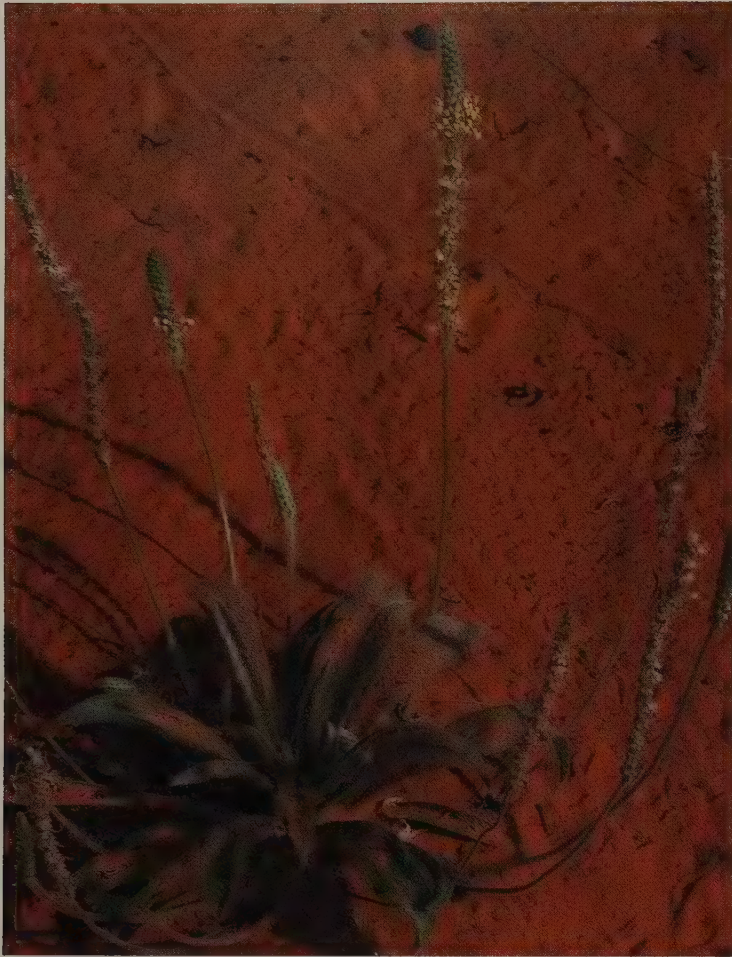
This is a cosmopolitan family and many members are the weeds of cultivation usually called plantains. All the species in Saudi Arabia are herbs which appear to be annual, dying off during long dry periods. they are very widespread, and after rains it is usually possible to find a few plants of one species or another. The small, wind-pollinated flowers are borne on an axillary spike.

***Plantago afra* ♦**

A slender branching herb 6 cm high with small terete leaves; flower heads 8 mm long.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; in a gravelly wadi. 2,000 ft.





Plantago albicans ◆

A narrow downy-leaved herb with flowering stems 15 cm long; slender flower heads 12 cm long and 4 mm wide with prominent creamy anthers. Widespread, especially in the north.

Near Suq al Ithnayn, 58 km SE of Abha; in crevices in a sandstone plateau. 7,900 ft.



Plantago ciliata ◆

A small leafy herb covered with silky white hairs; flower heads 1 cm long by 6 mm wide.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; in a gravelly wadi. 2,000 ft.



Plantago amplexicaulis ◆

A several-stemmed herb with a basal rosette of narrow leaves, and flower heads carried on stems 8 cm long; the coarse fruiting heads 1.8 cm long and 1 cm wide. Fairly widespread in the north.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; in a gravelly wadi. 2,000 ft.



Plantago coronopus ◆

A tufted leafy herb 5 cm high with narrow occasionally toothed leaves; flower heads 2.4 cm long by 4 mm wide.

Near Zabirah, 200 km north of Buraydah; in a claypan. 1,800 ft.



Plantago cylindrica ◆

A tufted herb with a basal rosette of narrow slightly downy leaves and flower stems 10 cm tall; tiny flowers in a head 2 cm long and 5 mm wide.

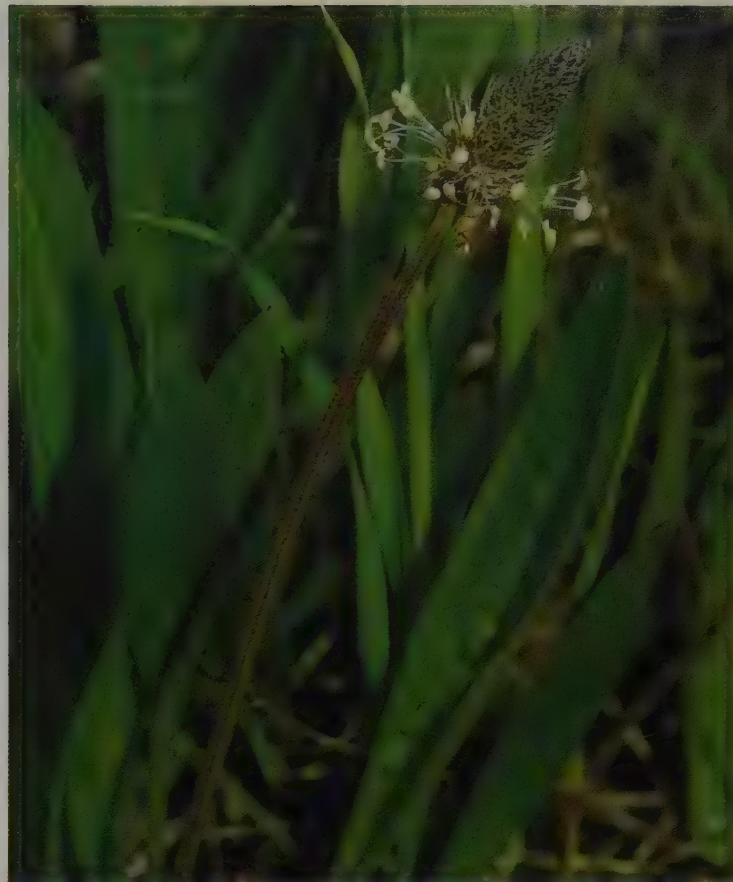
15 km N of Al Bahah, off the Taif-Abha road; among rock detritus. 7,000 ft.



Plantago major ◆

A leafy herb with wide leaves and ascending flower stems 14 cm tall; narrow flower heads 6 cm long.

Najran; a weed in a fallow field. 4,500 ft.



Plantago lanceolata ◆

A tufted herb with rosettes of ribbed leaves and erect flowering stems 45 cm tall; pointed conical flower heads 2.3 cm long with large creamy anthers; no scent.

Jabal Sawdah, 28 km NW of Abha; near the waterfall beauty-spot; in damp sand. 8,300 ft.



Plantago ovata ◆

A small white-downy herb with narrow leaves and stems 6 cm long; short wide flower heads 1.5 cm long. A fairly widespread herb.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; on a steep rocky hillside. 3,000 ft.

PLUMBAGINACEAE

Although many members of this family frequent dry and saline habitats, of the four species found in western Saudi Arabia only *Limonium axillare* and *L. cylindrifolium* grow near the sea; *L.*

thouini is widespread around Zabirah, growing mainly in thin sand over limestone; *Plumbago* has been found only in the foothills near the Yemen border.



Limonium axillare ◆

A perennial herb with leathery grey-green leaves and arching flower stems 15 cm long; rich magenta flowers 1 mm wide, in corymbs; sweet scent. Locally fairly abundant.

Near the creek, 25 km north of Jiddah, between Madinah road and the sea; on fossil coral. 20 ft.

◆ ***Limonium cylindrifolium***

A bushy shrublet 30 cm tall with very narrow almost cylindrical leaves; bright magenta flowers 5 mm wide.

Farasan Island, NE region; in saline sand near sea shore. 2 ft.





Limonium thouini ◆◆

An almost leafless branching annual herb with green stems 30 cm long, winged and flattened beneath the flowers; pale yellow flowers 6 mm long and 5 mm wide, cupped in white papery bracts. Locally fairly widespread.

Wadi Sabha, near Zabirah, 200 km north of Buraydah; in a shallow wadi in the limestone scarp. 1,800 ft.



Plumbago zeylanica ◆

A weak-stemmed shrubby (grazed) herb 75 cm tall; white flowers 1.7 cm wide, cupped in a long narrow calyx having hooked bristles, in a terminal spike; no scent.

Wadi Sud'r, 44 km SSE of Abha; among bushes in a well vegetated wadi, in granite. 3,800 ft.



POLYGALACEAE

Many members of this family have flowers that bear a superficial resemblance to the papilionaceous flowers of the Leguminosae, but the two families are not related. In Europe the common name for several species of *Polygala* is milkweed,

not because the plants produce a milky juice as do many Asclepiadaceae, but because when the plants are grazed by domestic cattle a flush of milk is produced.



Polygala abyssinica ◀ ▶

An erect many-stemmed herb 45 cm high; creamy flowers 1 cm long veined with reddish green, in long spikes; this species has two narrow stiffly erect dorsal petals and a pale pink lip. Locally abundant.

8 km SW of Al Hadda, off the Jiddah-Taif road; on a rocky hillside. 6,000 ft.



▶ ***Polygala irregularis***

A slender-stemmed twiggy herb with stems to 60 cm long; flowers 9 mm wide with two large white dorsal petals veined with green; rest of the flower pinkish with a frilled purple lip; no scent. Locally widespread.

Low rocky hills, 10 km NE of Jiddah; in hard sand. 100 ft.



***Polygala* sp. aff. *abyssinica* ◆**

A grazed shrublet 30 cm high with fairly stout stems; creamy flowers 1 cm wide, the rounded dorsal petals veined with green and the lip deep purple. In scattered localities from Jabal Radwa southward.

Between Al Bahah and Aqiq; among low rocky hills. 4,800 ft.

***Polygala* *erioptera* ◆**

An annual herb 25 cm high; flowers 8 mm long with two green dorsal petals edged white; very frilly white lip, tipped pink; no scent. In this species the petals nearly always have a twist. Fairly widespread.

Low rocky hills, 10 km NE of Jiddah; on stony hillside. 100 ft.



***Polygala* *senensis* ◆**

A grazed woody-based leafy herb 25 cm tall; flowers 1.5 cm wide, the two large dorsal petals held horizontally are pale yellow with fine reddish veins; deep magenta frilled lip. A very distinctive plant.

40 km north of Muhayl on the Jiddah-Jizan road; in hard sand and granite gravel. 1,500 ft.





Polygala sinaica ◆◆

A grazed woody-based herb with stems to 60 cm long; flowers 1 cm wide, the pale greyish pink dorsal petals veined in green; deep magenta lip. Widespread but not very abundant in the north.

Near Nabhaniyah; about 97 km west of Buraydah; in a sandstone outcrop. 2,800 ft.



Polygala subaphylla ◆

A fairly stout erect woody-stemmed herb 1.5 m high; grazed; large rosy-lilac flowers 1.2 cm wide with a deep pink lip. This species has wider petals than *P. abyssinica*, and the larger flowers are not so stiffly erect.

Jabal Manfah, 50 km NNW of Najran, on the Abha road; on a sandstone outcrop. 6,200 ft.



Polygala tinctoria ◆

An erect leafy herb 25 cm tall with wide leaves along the sparsely branching stems; nodding lilac flowers 1.8 cm wide with greenish-veined petals and deep magenta lip; no scent.

Jabal Fayfa, 100 km NE of Jizan; among rocks on a steep hillside. 4,500 ft.



***Polygala* sp. 5155** ◆

A small slightly woody herb with leafy stems to 5 cm long; creamy flowers 8 mm wide, the dorsal petals veined with dark crimson and with a bright magenta lip.

Near Al Assihap Park, between Abha and Jabal Sawdah; in a shallow rocky gully among junipers. 8,700 ft.

POLYGONACEAE



This large family is chiefly found in temperate regions and many species have tiny insignificant flowers, but in Arabia *Atraphaxis spinosa* and both species of *Calligonum* have attractive flowers though still quite small. *Rumex nervosus* and *R. vesicarius* both have persistent red sepals that become enlarged and membranous enclosing the fruit and which the layman could mistake for flowers.

◆ ***Calligonum crinitum* ssp. *arabicum***

A grazed bushy shrub 1 m high and 1.5 m wide with coarse green stems; white flowers 7 mm wide; sweet scent; the narrow fruits 1.5 cm long have sparse often unbranched long hairs.

100 km south of Al Arid Camp (19° 10' N, 45° 06' E); among large red dunes, edge of Rub' al Khali. 2,700 ft.

Atraphaxis spinosa ◆

A branching twigggy bush 60 cm tall; pale pink flowers 8 mm wide with red centres; faint scent.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; among rocks on a northwestern spur. 5,500 ft.





Calligonum polygonoides* ssp. *comosum ◆

A shrubby leafless green-stemmed bush, heavily grazed, 1.5 m high; white flowers 7 mm wide; sweet scent; oval fruits covered in long branching hairs. Widespread on sand dunes. Because this plant traps driven sand, each bush is on its own small dune.

5 km east of Najran Airport; in the dunes area. 4,000 ft.



Emex spinosus ◆

A prostrate leafy herb with stems to 60 cm long; green flowers 3 mm wide; no scent; the fruits develop within a reddish spiny calyx. A widespread herb, often a weed of cultivation.

Near Al Hadda, off the Jiddah-Taif road; near cultivation. 3,000 ft.



Oxygonum sinuatum ◆

A leafy branching herb with stems 30 cm long; white flowers 5 mm wide with blue anthers; no scent; pyramidal fruits with three spikes.

Jabal Fayfa, 100 km NE of Jizan; by the roadside near the summit. 5,600 ft.



Polygonum amphibium ◆

A leafy aquatic herb; bright pink flowers 2 mm wide, in a spike 3.5 cm long; sweet scent.

Tannumah, a watered valley 12 km south of An Nimas, Taif-Abha road; rooted in mud, the leaves floating on the surface of a deep pool in the river. 6,500 ft.



◆ *Polygonum aviculare*

A leafy semi-prostrate herb with radiating stems 10 cm long; pinkish white flowers 1.5 mm wide; no scent. A weed of cultivation.

Tannumah, a watered valley 12 km south of An Nimas, Taif-Abha road; in a fallow field. 6,500 ft.



◆ *Polygonum patulum*

A slender erect leafy herb 30 cm high; white flowers 3 mm wide; no scent. A weed of cultivation.

Between Riyadh al Khabra and Qassim; at the edge of a cornfield. 2,000 ft.

◆ *Polygonum setulosum*

A leafy herb with ascending stems 30 cm long and a few purplish marks on some of the long narrow leaves; tiny pinkish flowers 1 mm wide, in narrow spikes 4 cm long.

Tannumah, 12 km south of An Nimas, Taif-Abha road; in damp sand near the stream. 6,500 ft.

◆ *Rheum* sp aff. *vibes*

A prostrate herb with two or three large glabrous rugose leaves flat on the ground, the largest to 75 cm in diameter; short stalks 8 cm long; thick fleshy root with dark brown crumbly skin; flowers not seen.

40 km WNW of Turayf Camp (31° 40' N, 39° 29' E); on summit of undulation on limestone plateau. 2,900 ft.





◆ ***Rumex conglomeratus***

A leafy herb with stout stems 40 cm tall; pale green flowers 2 mm wide, in heads in the upper leaf axils.

Near Riyadh, on the road to Hair; along the margin of a sewage ditch. 2,000 ft.



◆ ***Rumex nervosus***

A many-branched bushy leafy herb 1 m high and 1.5 m wide; bright red sepals enclosing the fruits; edible foliage though not grazed by stock. Widespread in the Asir and south Hijaz, especially near cultivation.

Near Suq al Ithnayn, 58 km SE of Abha; in a rocky valley. 7,900 ft.



◆ ***Rumex pictus***

A semi-prostrate leafy herb 14 cm high with narrow glistening leaves; tiny yellowish flowers 1 mm wide; no scent.

Sandstone ravine at the headwaters of Wadi Qaraqir, 70 km SE of Wadi Sawawin iron-ore deposit; among red sand dunes. 2,800 ft.



◆ ***Rumex steudelii***

A leafy branching herb 1.5 m tall; yellow flowers 3 mm wide. A widespread weed in the Asir and southern Hijaz. Fruits are necessary for identification.

Jabal Sawdah, 28 km NW of Abha, near the waterfall beauty-spot; in damp sand. 8,300 ft.

Rumex vesicarius ◆

A greeny leafy erect herb 10 cm high; bright red flowers with pink and red sepals 7 mm wide enlarging to enclose the fruit; edible foliage. A widespread herb.

A granite valley in the Jabal Ash Shati range, between Wadi Sawawin iron-ore deposit and Ash Sharmah; in damp sand. 4,000 ft.



POLYPODIACEAE

The true ferns belong to the plant division Pteridophyta and to the Order Filicales. The species described below were all ascribed to Polypodiaceae until about 40 years ago, when many were separated into different families. The obsolete classification is followed here for convenience so that the

photographs are adjacent and more easily compared.

These ferns are perennial herbs, the fronds either tufted or arising from a creeping rhizome; the fronds are often pinnate with the fertile bodies, the sporangia, arranged in sori on the undersurface of the frond.



◆ ***Actiniopteris semiflabellata***

A small deep green fern with hard flat tufted fronds, resembling a miniature palm. Widespread in the Asir and south Hijaz.

Wadi Kharar, at the foot of the Taif escarpment, off the Makkah road; in a shady rock crevice. 1,500 ft.



◆ ***Adiantum capillus-veneris***

A delicate thin-fronded fern with wiry black stems 30 cm long. Widespread in the mountains in damp places.

Tannumah, a watered valley, 12 km south of An Nimas, Taif-Abha road; in a shaded crevice in rocks by the side of the river. 6,500 ft.



Adiantum incisum ◆

A fern with black wiry stems to 22 cm long and thin fronds serrate along one edge.

Jabal Fayfa, 100 km NE of Jizan; in shady crevice on a steep rocky well-vegetated hillside. 5,200 ft.



Asplenium trichomanes ◆

A small flat-pinnuled fern with wiry black stems 13 cm long, and tufted fronds.

Jabal Sawdah, 28 km NW of Abha, on western lip of the escarpment; in a shady crevice. 9,200 ft.



Anogramma leptophylla ◆

A tiny herb 1 cm tall with branched deeply lobed round leaves.

Wadi Kharar, near the foot of the escarpment, Jiddah-Taif road; in a very shady damp crevice, with liverworts. 1,500 ft.



Asplenium aethiopicum ◆

A fern with dentate fronds 12 cm long and toothed pinnules; reddish hairs on the young fronds. Locally fairly common.

The waterfall beauty-spot between Ahba and Jabal Sawdah; in a damp shady crevice. 8,500 ft.



◆ ***Ceterach officinarum***

A small fern with fairly thick fronds 6 cm long. Very widespread in the Asir and southern Hijaz.

5 km SW of Al Hadda, off the Jiddah-Taif road; in an exposed rock crevice near the lip of the escarpment. 6,500 ft.



◆ ***Cheilanthes coriacea***

A small fern with hard pinnate fronds to 6 cm long. Widespread especially in the Asir and southern Hijaz.

Near Al Bahah, on the Taif-Abha road; in a very shaded crevice on the crest of the ridge. 7,000 ft.



◆ ***Cheilanthes marantae***

A fern with fronds to 20 cm long; lobed pinnules, white-felted underneath when young, later turning brown; glossy green upper surfaces.

Near the head of Wadi al Uss, NW of Abha; in exposed rock crevice. 8,000 ft.



Cheilanthes pteridioides ◀

A small fern with black wiry stems 7 cm long and compound fronds; reddish hair-like scales on the young stems. Widespread in the Asir and southern Hijaz and occasionally in the north.

15 km SW of Al Hadda, off the Jiddah-Taif road; in a shady rock crevice near the lip of the escarpment. 6,300 ft.

Onychium melanolepis ◀

A delicate fern with slender green stems 6 cm long and divided fronds. Widespread in the Asir and southern Hijaz.

5 km SW of Al Hadda, off the Jiddah-Taif road; on the lip of the escarpment, in a shady rock crevice. 6,300 ft.



Cheilanthes vellea ◀

A small fern with white-downy pinnate fronds 9 cm long. Fairly widespread.

Wadi al Uss, on the western slope of Jabal Sawdah, NW of Abha, near the Police Post; in a shady crevice. 3,000 ft.

Pteris dentata* ssp. *dentata ◀

An erect fern with large pinnate fronds 1 m long.

Tannumah, a watered valley 12 km south of An Nimas, on the Taif-Abha road; in a damp ditch near the river. 6,500 ft.





◆ ***Pteris vittata***

A large fern with arching simple-leaved fronds to 65 cm long.

A red granite mountain 50 km south of Baljurshi, Taif-Abha road; in a shady crevice on a cliff-like road cutting. 6,500 ft.

PORTULACACEAE

The three species found in Saudi Arabia are more or less succulent, and unless specimens are frozen or boiled briefly they may take many weeks to dry when collected for the

herbarium. *Portulaca oleracea* is widely grown in the tropics as a vegetable, but in Saudi Arabia, especially in the south, it is often found growing apparently wild.





Portulaca quadrifida ◆ ◆

A semi-prostrate succulent-leaved tufted herb with long white hairs between the leaves; bright yellow flowers 1.5 cm wide, commonly four-petaled but six-petaled ones also occur; no scent. Abundant locally. This population has very large flowers; plants in other localities have flowers only 5 mm wide.

Halfway down the escarpment, on the road between Abha and Jizan; on a stony hillside near a dry river-bed. 3,500 ft.



◆ ***Portulaca oleracea***

A semi-prostrate succulent herb with stems 30 cm long; bright yellow flowers 1 cm wide; no scent. Fairly widespread.

Wadi Liyyah, near the Sudd Samallaqi Dam, 30 km south of Taif off the Abha road; in a shady crevice of an old rock wall. 5,000 ft.



Talinum cuneifolium ◆

A grazed leafy semi-succulent herb with stems to 1 m long; bright magenta flowers 2.5 cm wide, opening in the evening.

Wadi al Uss, on the western slope of Jabal Sawdah, NW of Abha, near the Police Post; in the shelter of shrubs in a wooded ravine. 3,200 ft.

POTAMOGETONACEAE

The species most commonly found in Saudi Arabia all grow in mud in fairly deep pools of water; *Potamogeton nodosus* has an erect flower spike above water, fairly broad leaves that float on the surface and narrower leaves that are submerged. *P. pusillus*

is almost totally submerged, only the tip of the short flower spike breaks the surface and the narrow brownish wavy-edged leaves are all the same size. *P. pectinatus* is totally submerged.



***Potamogeton nodosus* ◆**

An aquatic herb with branching stems 30 cm long with smooth oval leaves floating on the surface; small erect spikes of crowded bud-like flowers on stems 6 cm long.

A tributary of Wadi Wejj, 25 km south of Taif; in a pool of water in a stream-bed. 6,000 ft.

***Potamogeton pectinatus* ▼**

A very slender brownish aquatic herb with stems 35 cm long and narrow almost filiform alternate leaves; brown flowers 2 mm wide, in a widely spaced terminal spike; curved oval brown fruits with pointed tip, in groups of four. The stems exude a sheath of salt when drying.

285 km north of Jiddah, near Jabal Anagayn, off the new Madinah Highway; submerged in a clear pool of running water in a palm-filled cleft in a lava flow. 2,000 ft.

***P. pectinatus*; fruits ▼**





***Potamogeton pusillus* ◆**

An aquatic herb with slender leafy stems 1 m long and narrow brownish leaves; tiny flowers crowded on short spikes 6 mm long, which just break the surface of the water.

The waterfall beauty-spot between Abha and Jabal Sawdah; submerged in deep pools of running water. 8,500 ft.

PRIMULACEAE

Of the Saudi Arabian species only *Primula verticillata* resembles the primrose or primula familiar in Europe; however, the red form of *Anagallis arvensis* also occurs in Europe, chiefly as a weed; in Britain it bears the common name of scarlet

pimpernel. *A. arvensis* ssp. *foemina* is found in the northern as well as southern mountains of Saudi Arabia, but the other genera seem confined chiefly to the southern mountains.



***Anagallis arvensis* ssp. *arvensis* ◆**

A semi-prostrate spreading leafy herb with stems 14 cm long; pale scarlet flowers 1 cm wide with a darker centre; no scent. A weed of cultivation.

Najran; in a fallow field in the town centre. 4,500 ft.



***Anagallis arvensis* ssp. *foemina* ◆**

A creeping prostrate leafy herb; brilliant deep blue flowers 9 mm wide with a reddish centre; the petals have a shallow fringed edge; no scent. Abundant in scattered localities.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; a valley on the southwestern side, in damp sand. 1,400 ft.



***Anagallis* sp. nov.** ◆

A prostrate leafy perennial herb with stems 13 cm long; large pale pinkish lilac flowers 1.5 cm wide. Very abundant locally.

Near the waterfall beauty-spot between Abha and Jabal Sawdah; near the stream. 8,500 ft.



Primula verticillata ◆

A leafy-based herb with flower stems 20 cm long; bright yellow flowers 1.5 cm wide, in heads; no scent.

Jabal Sawdah, 28 km NW of Abha; in a small stream at the extreme lip of the escarpment. 9,000 ft.



Androsace maxima ◆

A small bushy herb 3 cm tall with a basal rosette of simple leaves and with a ring of small leaves at the branching points; tiny white flowers 2 mm wide, cupped in a five-lobed green calyx 1 cm wide; no scent; globular fruits.

20 km NW of Turayf Camp (31° 40'N, 39° 29'E); in a sandy runnel on a gravel plain over limestone. 2,900 ft.



Samolus valerandi ◆

An erect leafy herb with stems 13 cm high; tiny white flowers 2 mm wide, in heads; no scent. Fairly widespread in the southern mountains.

Jabal Sawdah, 28 km NW of Abha; near the waterfall beauty-spot. 8,500 ft.

RANUNCULACEAE

This very large family with a world-wide distribution has over 1,800 species, but only seven occur in Saudi Arabia.

The *Ranunculus* species grow in damp sand or in water, and

although the *Clematis* often grow among rocks, there is usually plenty of moisture. In *Clematis* the sepals and some of the outer stamens are petaloid.



◆ ***Adonis dentata*** ◆

A low branching herb with stems to 8 cm long and deeply dissected carrot-like leaves; glossy orange flowers 1.5 cm wide with a black centre; no scent; small fruits clustered along a spike which elongates as it ripens.

20 km NW of Turayf Camp (31° 40' N, 39° 29' E); in a gravelly runnel on limestone plateau. 2,900 ft.



Clematis incisodentata ♀ ♀

A slender many-branched climber with lobed leaves; white flowers 2.5 cm wide, in heads; sweet scent. Fairly widespread in the Asir and south Hijaz.

Wadi Habaqah, 31 km south of Baljurshi, on the Taif-Abha road; almost covering a shrub 2 m high, in a stream-bed near water. 6,200 ft.



Clematis simensis ♀

A tangled leafy vine with stems several metres long and entire slightly dentate glabrous leaves; white flowers 1.3 cm wide, in loose heads; sweet scent.

Tannumah, 12 km south of An Nimas, Taif-Abha road; in sand at the edge of a stream. 6,500 ft.





◆ *Delphinium sheilae*

A dying herb with a single erect stem to 35 cm long; pale blue flowers flushed with purple 2 cm long, including the horizontal or upward curved spur; no scent.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; on a northwest facing slope. 5,800 ft.



Ranunculus muricatus ◆

A tufted herb with palmately lobed dentate leaves and juicy stems to 20 cm long; yellow flowers 1.5 cm wide; curved flattened fruits with tubercled sides.

Riyadh; a weed in an old palm garden in the western district. 2,000 ft.



◆ *Ranunculus multifidus*

An erect leafy branching herb 60 cm high with deeply divided leaves; bright yellow flowers 1.8 cm wide; no scent.

Tannumah, a watered valley 12 km south of An Nimas, Taif-Abha road; in a damp ditch near the river. 6,500 ft.



Ranunculus trichophyllus ◆

A branching aquatic herb with finely divided leaves; white flowers 1.7 cm wide; no scent. The fruits are needed for identification.

Jabal Sawdah, 28 km NW of Abha; near the waterfall beauty-spot, rooted in mud in a pool of water. 8,500 ft.

RESEDACEAE

This is a small family world-wide, with only six genera, but no less than four of these occur in Saudi Arabia. Although the common garden plant *Reseda odorata* (mignonette) is grown for its strong sweet scent, most of the Arabian species have no

detectable scent. Some of the *Reseda* species are difficult to name with certainty because there seems a degree of variability within them, and ripe fruits are important.



◆ ***Caylusea hexagyna*** ◆

A spreading bushy herb with ascending stems to 35 cm long; small creamy flowers 3 mm wide with deep orange anthers, in long spikes; no scent. Widespread in the Asir and south Hijaz, and occasionally in the lowlands or the north, when it is very hairy.

Al Hadda, off the Jiddah-Taif road; near the lip of the escarpment. 6,000 ft.



◆ ***Ochradenus baccatus***

A tangled shrublet to 4 m high with narrow leaves; tiny yellow flowers 4 mm wide, in spikes; no scent; white fruits. A very widespread variable plant.

Low rocky hills, 10 km east of Jiddah; scrambling through a bush, on a rocky hillside. 100 ft.



Oligomeris linifolia ◆

An erect slender narrow-leaved branching herb 14 cm high; tiny greenish flowers 2 mm wide, in spikes; no scent. Fairly widespread in the north.

Wadi Sawwin iron-ore deposit, 75 km SW of Tabuk; in hard sand. 2,000 ft.



◆ ***Reseda arabica***

A sprawling herb branching from a basal leafy rosette with stems to 30 cm long and entire or only occasionally toothed leaves; flowers 5 mm wide with deep yellow anthers, in spikes; no scent.

Near Zabirah, 200 km north of Buraydah; in hard sand. 1,800 ft.



Reseda decursiva ◆

An erect herb 35 cm tall branching from the main stem and with dissected leaves having wavy margins; white flowers 6 mm wide; very strong sweet scent.

Turayf Camp (31° 40'N, 39° 29'E); in sandy runnel on limestone plateau. 2,900 ft.



◆ ***Reseda muricata***

A branching herb to 50 cm high with narrow deeply divided mealy leaves; small creamy flowers 3 mm wide, in spikes. A variable plant; sometimes the leaves are glabrous. Widespread in the north.

Jabal Manfah, 50 km NNW of Najran; in a wide sandy wadi. 6,200 ft.



◆ ***Reseda* sp.** ◆

A branching woody-based herb 1 m tall; white flowers 3 mm wide with prominent yellow anthers, in spikes; sweet scent.

In the headwaters of Wadi Qaraqir among 2,000 ft high red sandstone buttes; in rock rubble of a ravine. 2,800 ft.



◆ ***Reseda sphenocleoides***

An erect branching leafy herb 60 cm high with glabrous leaves; small yellowish flowers 7 mm wide, in spikes; no scent. Widespread in the southern Asir.

Partway down the escarpment, on the road between Abha and Jizan; among rocks. 5,000 ft.

RHAMNACEAE

Although not many species of this family occur in Saudi Arabia, they are fairly widespread, especially in the mountains, with one or other of the *Ziziphus* species occurring in most localities. *Z. spinachristi* is reputed to be the tree from which Christ's crown of thorns was fashioned, though the variety *inermis* has no thorns at all. The thin fleshy skin of the fruits of both varieties of *Z. spinachristi* is edible; it is sweet and tastes a little like a pear.

Berchemia discolor ♦

A leafy tree 5 m tall with a large crown and opposite leaves; greenish cream flowers 5 mm wide; no scent.

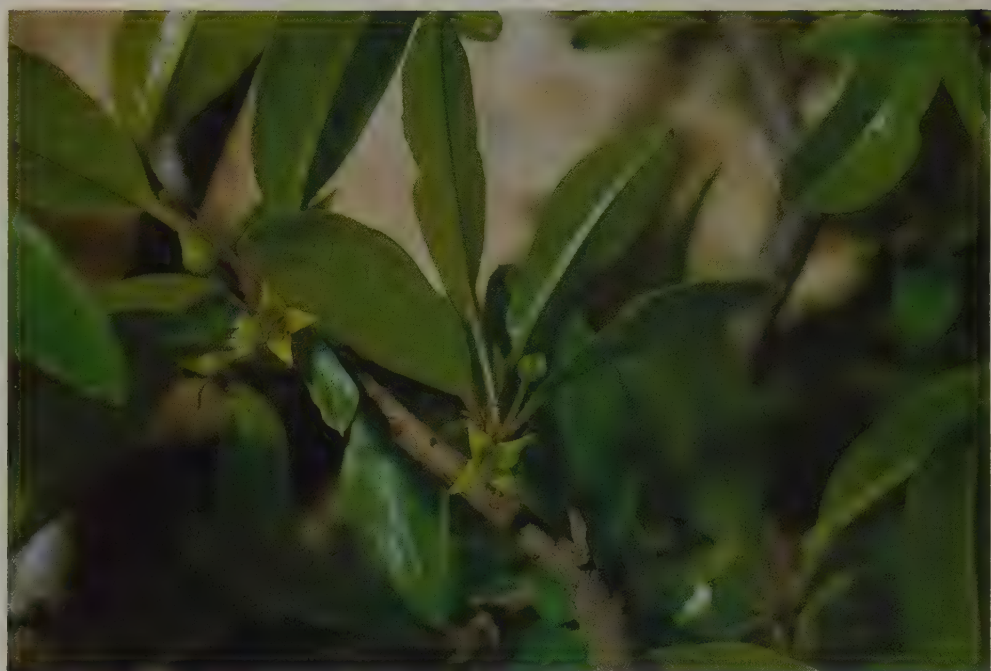
Jabal Fayfa, 100 km NE of Jizan; in a narrow rocky ravine near the base. 1,800 ft.



Rhamnus disperma ♦

An erect spiny leafy shrub nearly 3 m high; four-petalled green flowers 6 mm wide; no scent.

20 km north of Talhah, off the Abha-Najran road; in a small ravine. 6,500ft.



Rhamnus oleoides ♦

A stout grazed spiny shrub 30 cm high; greenish yellow flowers only 2 mm wide; no scent. Fairly widespread.

Near Suq al Ithnayn 58 km SE of Abha; in crevice of sandstone plateau near the lip of the escarpment. 7,900 ft.





◆ ***Sageretia thea***

A sprawling spiny shrub 1 m tall with dark green leaves; bud-like flowers 2 mm wide; no scent. Locally widespread.

Jabal Radwa, a 7,500 ft granite massif 70 km north of Yanbu; on a rocky hillside. 6,500 ft.



◆ ***Sageretia thea* var. *bornmuelleri***

A woody shrub 1.5 m high; tiny yellowish flowers 2 mm wide, in spikes; no scent; reddish fruits. Widespread in the Asir and south Hijaz.

5 km SW of Al Hadda, off the Jiddah-Taif road; on a rocky hillside. 6,000 ft.



◆ ***Ziziphus nummularia***

A tangled thorny leafy shrub 2 m high, some spines curved and some straight, and small oval leaves; greenish yellow flowers 3 mm wide; spicy scent; orange fruits. Widespread in the north.

Aban al Ahmar, a granite massif 145 km SW of Buraydah; near an old date grove. 4,000 ft.



***Ziziphus spina-christi* ◆**

A leafy shrubby tree 3 m tall with small shiny leaves and very thorny branches; greenish flowers 3 mm wide, in clusters; no scent. Similar to the variety *inermis* but always armed and often shrub-like with smaller glossy leaves. Widespread.

Between Taif and Jibub on the Abha road; in hard sand among low rocky hills. 5,800 ft.



***Ziziphus spina-christi* var. *inermis* ◆◆**

A tall leafy tree 12 m high with long leaves and without spines; pale greenish flowers 4 mm wide with musty smell; ripe fruits apricot-coloured and sweet-tasting. A widespread tree in the Asir and south Hijaz.

Jabal Manfah, 50 km NNW of Najran; in a wide sandy wadi. 6,200 ft.



RHIZOPHORACEAE

Half the world's tropical mangrove genera are found in this family, but in Saudi Arabia the common mangrove is *Avicennia marina* in the Verbenaceae family. *Rhizophora mucronata* is found only in a few widely scattered populations on mainly offshore islands in the Red Sea. It is a shrubby tree and superficially resembles *A. marina* among which it often grows. However, the stilt roots which grow from the trunk and branches are a

characteristic which affords a sure identification.

Rhizophora mucronata ◀ ▶ ◀ ▶ ▶

A very leafy bushy tree to 5 m tall with glossy bright green leaves and reddish adventitious roots; white hairy flowers 1 cm wide; fruits with developing radicles to 18 cm long.

Farasan Island; in a shallow bay among fossil coral slabs and seaward of a belt of *Avicennia marina* on a headland NE of the port. Sea level.



ROSACEAE

This is a very large family world-wide having about 3,370 species, and it is valued for such fruits as strawberries, apples and plums. None of the Saudi Arabian species has worthwhile fruits, though those of *Rosa*, *Rubus* and *Neurada* (when young) are edible. Some of the flowers vary greatly in appearance,

those of *Alchemilla* being hard to associate with a rose; this genus is interesting in that it can be apomictic, that is, reproduction is by seed formed without sexual fusion. Only *Neurada*, *Cotoneaster* and *Amygdalus* are found in the north; the other species all occur in the southern mountains.



◆ ***Alchemilla cryptantha***

A prostrate very leafy mat-forming herb with branching stems 30 cm long and palmately veined, often pleated leaves; tiny green bud-like flowers 4 mm long, on the underside of the stems; no scent.

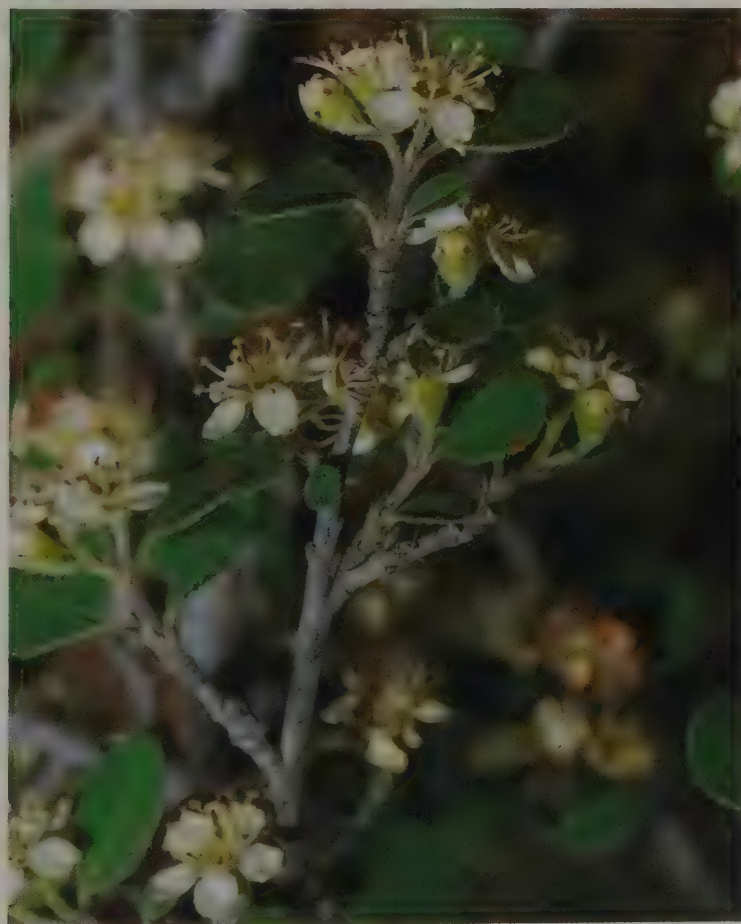
Jabal Sawdah, 28 km NW of Abha; in a wet exposed sand patch near the lip of the escarpment. 9,000 ft.



Amygdalus arabica ◆

A wide bushy shrub 1.5 m high, branching mainly from the base; white flowers flushed with pink 2.5 cm wide, borne all along the stems; strong sweet scent. The flowers appear mainly before the narrow dentate leaves. Locally widespread in the basalts, lining the narrow wadis.

180 km SSW of Turayf Camp, near Turayf; in narrow sandy wadi in basalt. 2,300 ft.



Cotoneaster racemiflora ◆◆

A densely twiggy leafy semi-pendent shrub 1.5 m high; white flowers 7 mm wide; no scent; small reddish-purple fruits. Abundant in restricted localities near An Nimas, Abha and Jabal Dabbagh.

120 km south of Baljurshi, between Taif and Abha; edge of abandoned terrace above the road. 6,500 ft.





***Crataegus sinaica* ◆**

A bushy leafy several-trunked tree 4 m tall with rough bark and unevenly trilobed leaves having a few white hairs; white flowers 1 cm wide with dark red anthers, in few-flowered heads to 4 cm wide; spicy musty scent. The author has found this species only once, but

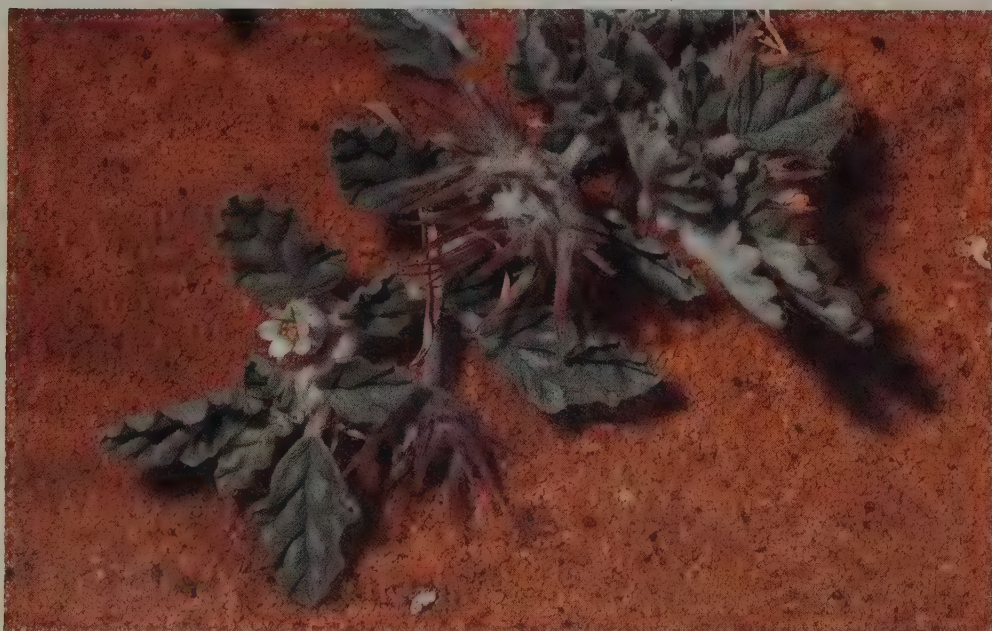
the plant was at least 30 years old, did not appear deliberately planted by man, and was felled to make room for a house in 1985.

2 km south of An Nimas, Taif-Abha road; on a rock wall bordering an old field. 7,000 ft.

***Neurada procumbens* ◆**

A small prostrate leafy herb; white flowers 6 mm wide; no scent. The relatively large soft-spiny fruits are edible when young. A very widespread plant in the north.

In the headwater area of Wadi Qaraqir; in a shallow sandy wadi among huge red sandstone bluffs. 2,800 ft.



***Potentilla hispanica* ◆**

A tufted leafy perennial herb 50 cm tall with dark green compound leaves, the opposite leaflets dentate; bright yellow flowers 1.3 cm wide, in densely clustered terminal heads; no scent.

Near Al Khadara, off the road 163 km north of Abha; in damp sand at margin of a small track. 7,000 ft.





Prunus cf. microcarpa ◆

A grazed spiny shrub 30 cm tall, the leaves having dentate margins; white flowers 7 mm wide; no scent; orange fruits.

Near Talhah, off the Abha-Najran road; in old mine workings 2 km east of the road. 6,500 ft.



Rosa abyssinica ◆

A thorny shrubby scrambler with stems to 4 m long; creamy-white flowers 2.5 cm wide; sweet scent. Very widespread in the Asir and south Hijaz.

100 km south of Baljurshi, Taif-Abha road; among rocks on a wooded slope. 6,100 ft.



Rubus cf. canescens ◆

A tangled thorny bush with slightly hairy stems 5 m long and leaves downy on the underside; white flowers 2 cm wide with pinkish stamens; no scent.

Tannumah, a watered valley, 12 km south of An Nimas, Taif-Abha road; in a rock crevice on the river bank. 6,500 ft.



Rubus sanctus ◆

A weak-stemmed leafy thorny shrub 1.5 m wide and 1 m high; dark pinkish purple flowers 2 cm wide; no scent.

Al Bahah, on the Taif-Abha road; on the retaining wall of a terraced field. 7,000 ft.

RUBIACEAE

This family is a large one having over 7,000 species, and it includes two economically important ones, coffee and quinine. Although coffee, *Coffea arabica*, has a name that suggests it comes from Arabia, the plant was probably introduced in ancient times from Ethiopia; it is fairly widely cultivated in the Yemen and the delicately flavoured beans were in the past

mainly shipped from the port of Mocha. However, the author has not yet found wild plants, even near the Yemen border. The genera found in Saudi Arabia are fairly widespread though growing mainly in rocky regions. They vary greatly in appearance, with the herbaceous *Galium* and *Valantia* bearing no resemblance to the shrubby *Pentas* or *Canthium*.



◆ ***Callipeltis aperta***

A delicate herb with ascending stems to 12 cm long; in fruit, each fruit protected by a papery bracteole 4 mm long, in whorls. Similar to *C. cucullaria*, but the bracteoles are more rounded.

Wadi Sawawin, 75 km SW of Tabuk; in shady crevice on steep rocky hillside. 3,000 ft.



◆ ***Canthium phyllanthoideum*** ◆

A grazed erect leafy shrub nearly 2 m high with small narrow opposite leaves; creamy-white flowers 5 mm wide; sweet scent.

About 1 km off the road, between Abha and the airport; among granite boulders. 6,000 ft.

◆ ***Callipeltis cucullaria***

A slender tufted leafy herb with stems to 7 cm long; creamy bud-like flowers 1 mm wide, in papery bracteoles.

One-third of the way up the escarpment, Jiddah-Taif road; in shady rock crevice. 3,500 ft.



Canthium schimperianum ◆

A shrubby leafy tree 5 m tall with fairly large opposite leaves; white flowers 5 mm wide; very strong sweet scent; round green berries.

Jabal Fayfa, on the steep SW approach road, 100 km NE of Jizan; on a steep hillside. 4,200 ft.

Crucianella ciliata ◆

A dead herb, sparsely branching, 18 cm tall; crowded fruits in papery bracts along a spike. The seeds distinguish it from the similar *C. membranacea*.

Jabal Radwa, a 7,500 ft granite massif 70 km north of Yanbu; in hard sand among granite boulders. 6,500 ft.



Crucianella membranacea ◆

An erect sparsely branching herb 15 cm tall with tiny bud-like flowers nestling in leafy bracts along a spike; no scent.

A valley on the southern side of Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; among rocks. 1,800 ft.

Galium aparine ◆

A leafy weak-stemmed herb with stems 1 m long; tiny white flowers 1 mm wide; round fruits with small hooked hairs.

Near the road through the Queen's Forest, Al Bahah, off the Taif-Abharoad; scrambling through a dead acacia, near cultivation. 7,900 ft.





Galium aparinoides ♣

A scrambling herb with weak stems to 30 cm long and very sticky leaves in whorls; pinkish green flowers 3 mm wide, in loose heads on long pedicels; large white fruits.

The waterfall beauty-spot between Abha and Jabal Sawdah; in grass tufts near water. 8,500 ft.



Galium kahelianum ♣

A small herb with crowded leafy stems 7 cm long, the leaves frequently in opposite pairs; tiny bud-like flowers 1 mm wide.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; in a shady crevice on a steep hillside. 2,500 ft.



Galium setaceum* ssp. *decaisnei ♣

A very delicate herb with branching stems to 25 cm long; greenish bud-like flowers 1 mm wide. A very widespread herb in shady cracks.

Halfway up the escarpment, Jiddah-Taif road; in a damp shady crevice. 4,200 ft.





Galium spurium* var. *africanum ◆

A weak-stemmed leafy herb 15 cm high; tiny bud-like flowers 1 mm wide.

In the headwaters of Wadi Qaraquir, 70 km SE of Wadi Sawawin iron-ore deposit; in a ravine in red sandstone. 2,800 ft.



Galium tricornutum ◆

A leafy weak-stemmed herb with stems to 20 cm long and sticky leaves in whorls; white flowers 1.5 mm wide, on relatively long stalks.

Near Jabal Ibrahim, off the Taif-Al Bahah road; among grasses bordering a fallow field. 6,800 ft.



Galium yemense ◆

A woody-based dwarf cushion-herb 6 cm high with crowded stems and narrow heath-like leaves; pale green flowers 1 mm wide.

Near the head of the Grandi Lavori road, 5 km south of Baljurshi; in a rock crevice on the lip of the escarpment. 7,000 ft.



***Galium yemense* sensu lato** ◆

A tangled leafy herb with slender stems to 25 cm long; greenish flowers 1 mm wide, along the apical portion.

Near Jabal Ibrahim, off the Taif-Al Bahah road; in crevice of shady cliff. 6,000 ft.



***Galium* sp. 2892** ◀

A delicate herb with leafy branching stems to 20 cm long, the leaves usually in opposite pairs; tiny fruits in loose heads.

Jabal Radwa, a 7,500 ft. granite massif 70 km north of Yanbu; pendent from a shady rock crevice. 6,500 ft.



***Galium* sp. 3375** ◀

A bushy leafy perennial herb, many-branched from the base, with stems 10 cm long; bud-like flowers 1 mm wide, clustered in usually terminal heads.

Halfway up the escarpment, Jiddah-Taif road; in crevice of shady cliff. 4,000 ft.



Kohautia caespitosa ▶▶

A very slender erect woody herb with stems to 60 cm tall; pale creamy flowers 8 mm wide; no scent. A very widespread herb but easily overlooked and very variable.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; in hard sand. 2,000 ft.



Pavetta longiflora ◆

A leafy shrub 1 m tall; white flowers 3 cm long and 1 cm wide; sweet scent; downy fruits.

Jabal Fayfa, 100 km NE of Jizan; on a steep well-vegetated hillside. 5,000 ft.

***Pavetta ? pammalaka*** ◆

A dwarf bushy leafy shrub 25 cm high with grey-green leaves. Wintering; flowers not seen.

A flat-topped sandstone hill 75 km WNW of Najran; in a crevice on the summit plateau. 7,100 ft.

***Oldenlandia capensis*** ◆

A leafy herb with narrow leaves and woody base, the stems to 10 cm long; white four-petalled flowers 4 mm wide; no scent.

Grandi Lavori road, 25 km from its junction with Jiddah-Jizan road; in damp sand among granite boulders. 2,500 ft.





◆ ***Pentas lanceolata***

A bushy leafy shrub 60 cm high; white five-lobed jasmine-like flowers 1.3 cm wide, in flat heads; no scent. Fairly widespread in the southern mountains.

Near Suq al Ithnayn, 58 km SE of Abha; in a small ravine in the sandstone plateau. 7,800 ft.



◆ ***Valantia hispida*** ▲

A slender erect leafy herb 12 cm high; tiny bud-like flowers 1 mm wide; hairy fruits. Fairly widespread in the Asir and south Hijaz.

Halfway up the escarpment, Jiddah-Taif road; in a rock crevice. 4,000 ft.



◆ ***Pterogaillonia calycoptera***

An erect slender green-stemmed herb 35 cm tall; small white four-lobed flowers 3 mm wide, clasped by two persistent whitish bracts. Fairly widespread but nowhere common.

Jabal Manfah, 50 km NNW of Najran off the Abha road; on a rocky hillside. 6,200 ft.



◆ ***Sherardia arvensis***

A leafy herb with crowded stems 4 cm high; pale blue flowers 2 mm wide; no scent. Fairly widespread in the Asir and south Hijaz.

Wadi Mahra, 82 km south of Baljurshi, on the Taif-Abha road; in damp sand by a stream. 6,500 ft.

RUTACEAE

This family includes the genus *Citrus* yielding such fruits as oranges and lemons, but these do not occur wild in Arabia. The two herbs, *Haplophyllum* and *Ruta*, are both strongly and unpleasantly aromatic, but the shrubby tree *Teclea* is pleasantly aromatic and the leaves are dotted with oil glands. *Ruta*, or rue,

is a poisonous plant but was an ancient herbal remedy for a variety of ailments, from cramp to hysteria and diseases of the womb, and even today many Yemenis gather the plant for their women to use.



◆ ***Haplophyllum tuberculatum***

An erect branching herb 45 cm high with warty leaves; yellow flowers 8 mm wide; very strongly aromatic; sour smell. A widespread and variable plant, the stems sometimes prostrate; seldom grazed.

Near the airport, Najran; in hard sand. 4,300 ft.



◆ ***Ruta chalepensis*** ◆

A leafy branching herb 45 cm high with pinnate blue-green leaves; yellow flowers 1.5 cm wide; strong unpleasant aroma. Widespread in the Asir and south Hijaz.

A red granite mountain 15 km SW of Al Hadda, off the Jiddah-Taif road; on a rocky hillside among junipers. 7,000 ft.



◆ ***Teclea nobilis***

A leafy droopy-branched shrub 3 m high; trifoliate leaves easily confused with those of *Rhus*; yellow flowers 5 mm wide; the ripe fruits are orange; aromatic. In Africa it occurs as a tall forest tree.

Partway down the Grandi Lavori road, 5 km south of Baljurshi; growing from a cliff. 5,000 ft.

SALICACEAE

Although it has only four genera, this family has an almost world-wide distribution. It is not certain if the *Salix* found in Saudi Arabia was originally an introduction from elsewhere, for although it grows apparently untended, the author has seen

it only near cultivation. The flowers are unisexual, male and female borne on separate plants, in an inflorescence commonly called a catkin.



◆ ***Salix subserrata*** ◆

A leafy bushy single-trunked tree 12 m high; creamy-white male catkins 2 cm long; no scent. Occasionally found throughout the Asir and south Hijaz when protected from grazing.

Between Abha and An Nimas on the Taif road; near cultivation, in a valley. 6,500 ft.

SALVADORACEAE

This small family of only three genera has two in Saudi Arabia. The most widespread is *Salvadora persica*, occurring from sea level to about 1,500 metres, where it grows on sand dunes or rocky hillsides or even cliffs, and remains green and leafy the year round. It is often known as the toothbrush bush because frayed lengths of the slightly astringent fibrous roots are widely

used by Arabs to clean their teeth; the pink and purple berries are edible and it is reputed that the leaves are sometimes used in a salad; however, stock seem to graze the plant only as a famine food. *Dobera glabra* occurs in the south mainly below 500 metres; it is a very round-crowned tree that does not appear to be used locally.



Dobera glabra ◆◆

A leafy round-crowned tree 7 m high; creamy-white flowers 3 mm wide, in panicles; sweet scent. Widespread in the southern foothills and near Jizan.

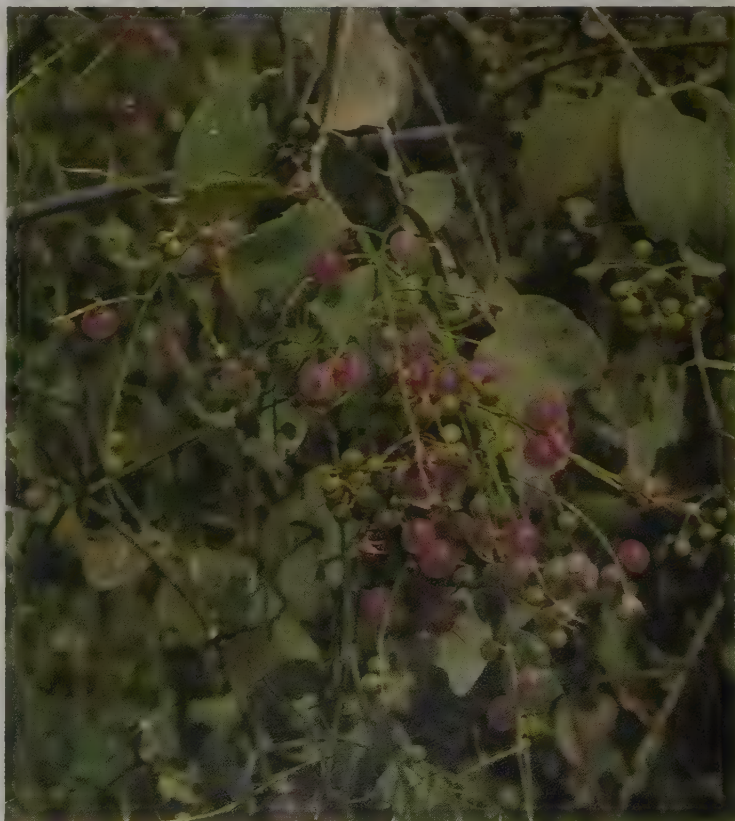
80 km SE of Qunfudhah; on a rocky hillside. 300 ft.



Salvadora persica ◆◆

A leafy shrub forming dense patches with slender drooping stems 5 m long; creamy flowers 2 mm wide, in panicles; no scent; juicy pink and red edible berries. Very widespread, especially in the south, and somewhat variable.

40 km north of Al Lith on the Makkah road; among small sand dunes. 30 ft.





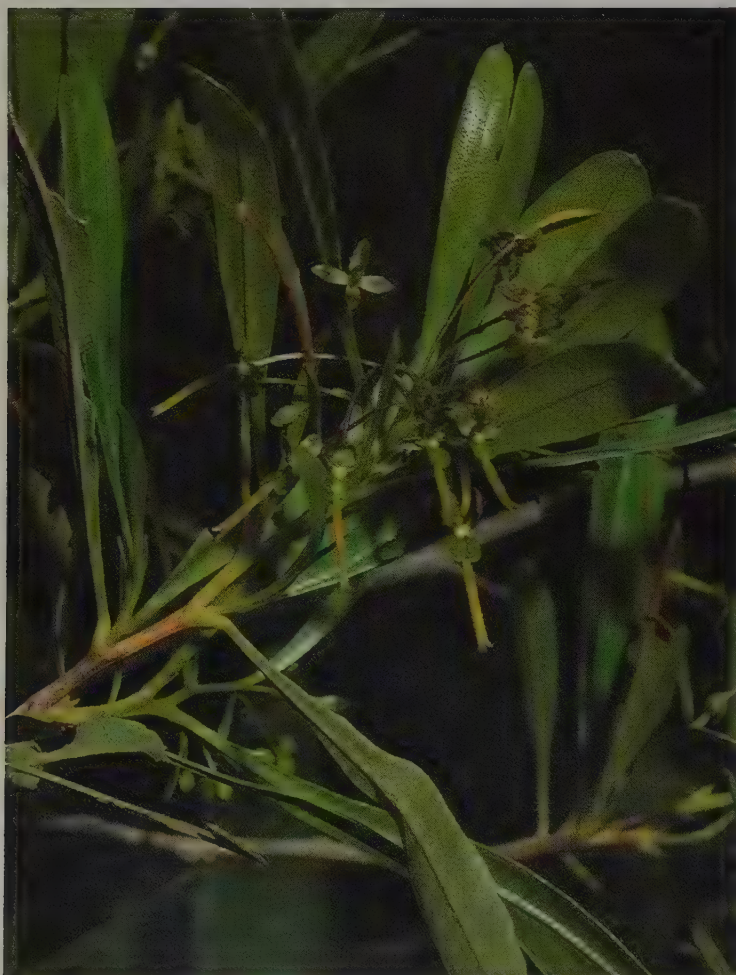
SANTALACEAE

This is the family of the aromatic sandalwood tree, *Santalum album*, but *Osyris abyssinica* is not fragrant. Although widespread in parts of Africa, *O. abyssinica* has so far been recorded from only two localities in the southern Hijaz, where several plants were found growing in shallow ravines.

◆ *Osyris abyssinica*

A branching leafy shrubby tree 4 m high; greenish yellow flowers 3 mm wide; ripe fruits orange.

A red granite mountain 15 km SW of Al Hadda, off the Taif-Jiddah road; in a ravine on the lip of the escarpment. 7,000 ft.



SAPINDACEAE

Two members of this family occur in Saudi Arabia and one, *Dodonaea*, is very widespread in the mountains, especially in the south. A species that grows in China, *Litchi chinensis*, yields a delicious fruit, but the fruits of *D. viscosa* are not edible and its foliage is seldom eaten by livestock. *Allophylus* has been collected only once.

◆ *Dodonaea viscosa*; female flowers



Allophylus rubifolius ◀

A shrubby leafy tree 3 m tall with trifoliate leaves, some of them reddish coloured; in bud, the tiny buds in tassels 2 cm long; non-aromatic.

Jabal Fayfa, 100 km NE of Jizan, on steep SW approach road; in a shady crevice of a cliff. 3,900 ft.



Dodonaea viscosa ◀ ▶

An erect leafy bushy shrub 1.5 m high; faintly aromatic; green and purplish flowers 5 mm wide, male and female on separate plants; no scent; large scarlet-flushed winged fruits. Very widespread in the mountains.

Near Wadi Wejj, 18 km SW of Taif; among granite boulders. 5,500 ft.



SAPOTACEAE

Monotheca buxifolia is common in parts of Africa but found only rarely in Saudi Arabia, where it seems confined to the escarpment region around Abha and to the tops of the higher

mountains to the southwest; *Mimusops laurifolia* seems to grow only near Jabal Fayfa.



◆ ***Mimusops laurifolia*** ◆

A large-trunked tree 30 m tall with dark brown rough grooved bark and a large crown of shiny dark green leaves with pale midrib and petioles. In fruit; oval greenish fruits 4 cm long with sweet-tasting flesh surrounding narrow shiny brown seeds.

Near Jabal Fayfa, 100 km NE of Jizan; growing in untended groves along the river-bank upstream of Bani Malek. 2,800 ft.





Monothea buxifolia ◆◆

A leafy shrubby tree 4 m high; tiny brownish flowers 3 mm wide, clustered in the leaf-axils; no scent.

Jabal Abu Hassan, a sandstone-topped mountain, off the escarpment SE of Abha; on the summit plateau. 5,500 ft.

SCROPHULARIACEAE

This is a large family world-wide, having about 3,000 species, many of which are herbs. There are also semi-parasites, such as *Striga*, and the entirely parasitic non-green *Alectra*. The flowers within this family vary greatly in appearance, from the spurred two-lipped five-lobed *Kickxia*, to the tubular *Anticharis*, or the

flat four-petalled *Veronica*. Some members of Acanthaceae, Orobanchaceae and Solanaceae bear flowers with a marked resemblance to those within this family.



Alectra parasitica ➤

An erect several-stemmed root parasite with brown 'bracts' on stems 22 cm long overall; yellow flowers 8 mm wide; no scent. Host plant possibly *Hypoestes forskalei*.

Partway down Grandi Lavori road, 5 km south of Baljurshi; on a ledge on a cliff. 3,000 ft.



Anarrhinum orientale ➤

A slender erect sparsely branching herb 1 m tall; small white flowers 3 mm wide, in long spikes; no scent. Fairly widespread in the mountains.

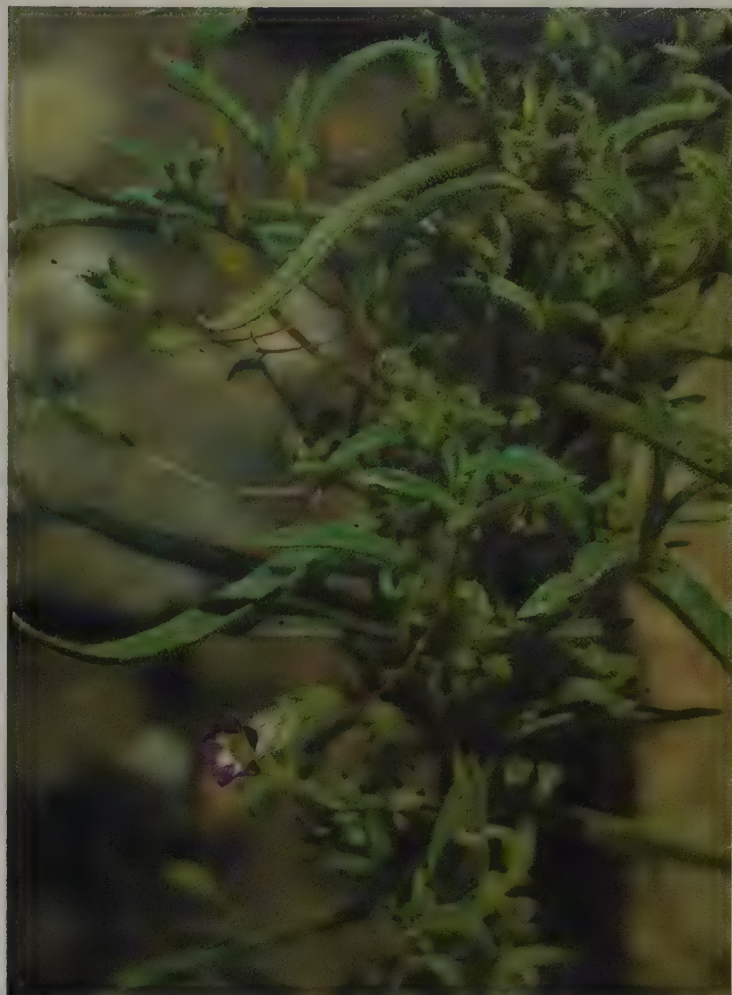
Near Suq al Ithnayn, 58 km SE of Abha; in a rock crevice of a shallow ravine in the sandstone. 7,800 ft.



Anticharis arabica ◆

A small leafy glandular herb 10 cm high; pale bluish lilac tubular flowers 6 mm long with a white throat; no scent. Widespread in the lowlands around Jiddah.

Low rocky hills, 10 km east of Jiddah; among rocks. 80 ft.



Anticharis linearis ◆

An erect glandular herb to 17 cm tall with crowded very narrow leaves; tubular deep lilac purple flowers 1.2 cm long and 4 mm wide with white throat, on long slender pedicels; aromatic. The plant dries blackish-green.

Headwaters of Wadi Mansa'ah, a tributary of Wadi al Lith, 200 km south of Jiddah; on a steep rocky hillside. 1,600 ft.



Anticharis glandulosa ◆

A bushy leafy herb with stems to 25 cm long and very oily glandular leaves; lilac or deep blue flowers 1 cm long and 4 mm wide; slightly aromatic.

Al Wahbah, a crater 100 km north of Radwan, on the Taif-Riyadh road; in crevices of black lava flow. 4,000 ft.



Aptosimum pumilum ◆

An erect very leafy slightly hairy herb 15 cm high; pale lilac flowers 8 mm long with reddish blotches just inside the throat; no scent.

Jabal Manfah, 50 km NNW of Najran, on the Abha road; in hard sand near sandstone outcrop. 6,200 ft.



Bacopa monnieri ◀

A leafy mat-forming prostrate herb with succulent leaves; pale lilac flowers 8 mm wide; no scent. Widespread in wet sand especially in the south.

Najran; in wet sand near cultivation. 4,500 ft.



Chascanum marrubifolium ◀

A branching leafy herb 35 cm high; creamy flowers 6 mm long and 2 mm wide, in spikes; no scent. Evening flowering.

Jabal Mershid, 40 km east of Qunfudhah; in hard sand. 50 ft.

[This species belongs to Verbenaceae and is included here in error.]



Campylanthus pungens ◀

An erect bushy leafless green-stemmed grazed shrublet 25 cm high; pink tubular flowers 1 cm long; no scent. Widespread in the Asir and south Hijaz.

Between Al Hadda and Taif; on a rocky hillside near the road. 5,600 ft.



Craterostigma pumilum ◀

A dwarf leafy herb 3 cm high; white flowers 9 mm wide with deep lilac blotches on the petals; no scent. Locally widespread.

Near Suq al Ithnayn on the road to Khamis Mushayt; in a gravel pan among huge flat granite boulders. 7,300 ft.



***Kickxia abhensis* sp. nov. ♣**

A slender tangled leafy annual herb with long narrow leaves and stems to 40 cm long; yellow flowers 1 cm long with a short spur and reddish 'hood'. The lip is always twisted.

Halfway down Wadi al Uss, off the western slope of Jabal Sawdah, NW of Abha; on a steep rocky slope. 5,000 ft.



***Kickxia aegyptiaca* ♣**

A semi-prostrate small-leaved herb with stems to 25 cm long; yellow flowers with red spots on the lip and with a long slender violet spur, 1.6 cm long, including the spur. A variable plant; widespread in the north.

Near Nabhaniyah, 100 km SW of Buraydah; in hard sand. 2,300 ft.



***Kickxia acerbiana* ♣**

A fairly stout-stemmed leafy herb with stems to 10 cm long and almost orbicular palmately veined leaves; yellow flowers 7 mm long with short spur. Fairly widespread in scattered localities.

Yanbu al Bahr, on the coastal plain near town; in hard sand. 20 ft.



***Kickxia coralii* sp. nov. ♣**

A prostrate leafy annual herb with stems to 30 cm long and large hastate basal leaves; yellow flowers 7 mm wide and 1.5 cm long with a few red spots on the lip and a long straight downy spur. Fairly widespread near the coast, always over fossil coral, sometimes twining over bushes.

Near Jiddah, a shallow ditch between the new Jiddah Airport and Madinah Road; in hard sand over fossil coral. 20 ft.



◆ ***Kickxia elatine* ssp. *crinita***

A weak-stemmed branching, very downy, leafy herb, the stems to 40 cm long and with lower leaves saggitate; yellow flowers 1.3 cm long with bright purple 'hood'.

Near Jabal Ibrahim, off the Taif-Al Bahah road; in damp sand near a small pool, clambering among grasses. 7,000 ft.



◆ ***Kickxia* sp. aff. *petiolata*** ◆

A bushy leafy herb with slender stems 30 cm long, the lower leaves large and saggitate and with a distinct petiole; hairy yellow flowers 1 cm long with reddish 'hood'.

Jabal Fayfa, 100 km NE of Jizan, on the steep SW approach road; on a cliff. 4,000 ft.



◆ ***Kickxia hastata***

An erect very delicate annual herb with usually unbranched hair-like stems to 25 cm long and arrow-shaped leaves; tiny yellow flowers 3 mm long, on long pedicels.

Near the foot of Jabal Sharda, off the Jiddah-Muhayl-Jizan road; in granite sand among granite boulders. 1,000 ft.



◆ ***Kickxia* sp. nov. 3311.** ◆

A bushy stemmy shrubby herb 30 cm tall; yellow flowers 1.3 cm long, the length of spur variable. Similar to *K. pseudoscoparia*, but the narrow leaves do not twist.

Near Talhah, off the Abha-Najran road; in crevice among granite boulders. 6,500 ft.



***Kickxia pseudoscoparia* sp. nov. ♀♂**

A twiggy almost leafless perennial herb to 75 cm high, the basal leaves hastate and the small stem leaves twisted; yellow flowers 1.3 cm long and 7 mm wide; no scent. Very widespread and somewhat variable.

Near Al Hadda, off the Jiddah-Taif road; among rocks. 6,800 ft.



◆ ***Kickxia* sp. nov. 4389**

A woody-based herb with prostrate stems to 22 cm long and small oval glabrous leaves; yellow flowers 1 cm long including the short spur, the lip heavily freckled with red; no scent.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; in granite crevice on NW side. 5,500 ft.





Linaria chalepensis ◆

A slender mostly unbranched erect herb to 20 cm tall with narrow opposite leaves; white flowers 1 cm wide with a long slender curved spur; no scent.

Between Al Bahah and Jabal Ibrahim, off the Taif-Abha road; in an exposed fallow field. 7,000 ft.



Linaria haelava ◆

A slender erect herb 10 cm high with terete leaves; deep lilac flowers 1 cm long with a prominent white and yellow callus on the lip. Locally fairly common.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; in a gravelly wadi. 2,000 ft.



Linaria* sp. aff. *haelava ◆ ◆

A leafy herb 15 cm high with narrow flat leaves; white flowers with a deep orange callus on the lip and lilac-flushed dorsal petals. There is a pure white colour form.

Among red sandstone buttes, between Shiqri and Tabuk; in drifted sand. 3,000 ft.





◆ *Linaria simplex*

A compact bushy leafy herb 15 cm high with narrow flat leaves; yellow flowers 5 mm long.

A valley on the southern slope of Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; among rocks. 1,800 ft.



◆ ◆ *Lindenbergia indica*

A bushy leafy woody-based herb with stems to 50 cm long; yellow flowers 1 cm long with reddish 'dorsal petal'; non-aromatic. A widespread variable plant.

Najran; in a rock-cutting near the town. 4,500 ft.



◆ *Linaria* sp. aff. *tenuis*

A delicate erect herb 10 cm high with terete leaves; bright yellow flowers 7 mm long.

21 km north of Qiba and 100 km north of Buraydah; in a shallow wadi near a limestone outcrop. 1,500 ft.





***Lindenbergia* sp. aff. *indica* (A) ♣**

A bushy leafy herb with stems to 25 cm long; short yellow flowers, the broad lip 8 mm wide; non-aromatic. Locally fairly abundant.

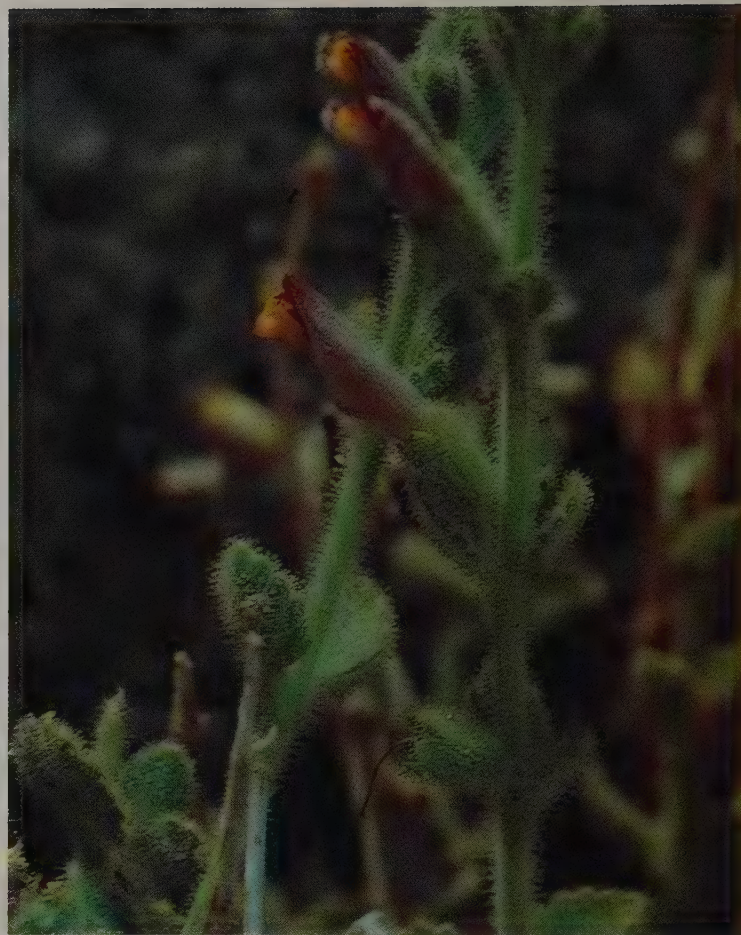
Jabal Fayfa, 100 km NE of Jizan; among shrubs on well-vegetated hillside. 4,800 ft.



***Lindenbergia* sp. aff. *indica* (B) ♣**

A leafy herb 13 cm tall; yellow flowers 1 cm long with a broad lip 7 mm wide; non-aromatic. Locally abundant.

Halfway up the escarpment, Jizan-Abha road; on a steep rocky hillside. 4,500 ft.



***Lindenbergia* *sinaica* ♣**

A very leafy bushy woody-based herb 60 cm high; slender deep orange-yellow flowers 1.2 cm long with a purplish brown 'dorsal petal'. The whole plant is very glandular and oily to touch; strongly aromatic, resembling mocha coffee. A scarce but widespread plant.

Near the Government Well, Wadi Sawawin, 80 km SW of Tabuk; among boulders in a ravine. 2,000 ft.



***Misopates* *orontium* ♣**

An erect herb 13 cm high; white flowers flushed with lilac 6 mm long; no scent. A very widespread plant.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; on a steep rocky hillside. 2,500 ft.



Schweinfurthia pterosperma ◆

A leafy bushy herb 18 cm high; white flowers 1 cm long with a yellow callus on the lip; no scent. Locally fairly widespread, usually in saline sand.

Low rocky hills, 10 km east of Jiddah; among rocks. 80 ft.



Scoparia dulcis ◆

An erect leafy herb 45 cm high with square stems and dentate leaves; white flowers 8 mm wide with a 'furry' centre; no scent. Widespread near water in the south.

Near Suq al Ahad, 35 km east of Qunfudhah; in hard sand, near a stream. 40ft.



Scrophularia arguta ◆◆

An erect slightly white-hairy leafy herb 50 cm high; purplish red flowers 7 mm wide; no scent. A pure white colour form occurs near Taif.

Tannumah, a watered valley 12 km south of An Nimas, Taif-Abha road; among pink granite rocks. 6,500 ft.

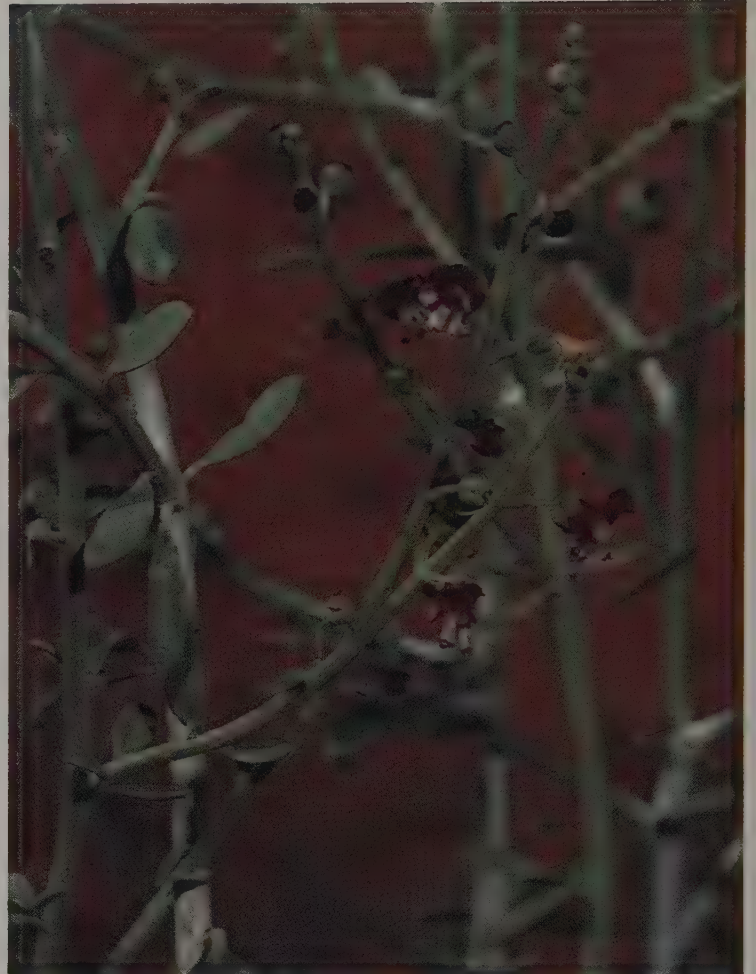




Scrophularia deserti ◆

A branching leafy-based herb with stems to 60 cm long and deeply lobed leaves; deep crimson and white flowers 5 mm wide; no scent. Fairly widespread especially in the north.

Near Nabhaniyah, 100 km SW of Buraydah; among rocks. 2,300 ft.



Scrophularia hypericifolia ◆ ◆

A very bushy shrub 60 cm high with a thick woody stem and small entire leaves; dark red flowers 4 mm wide with a white lip. Abundant among red sand dunes in the north.

Near Zabirah, 200 km north of Buraydah; on a red sand dune. 1,800 ft.



Striga asiatica ♦

A slender herb with stems 10 cm long and tiny leaves; bright scarlet flowers 1 cm wide; no scent. This plant is reputed to be parasitic on grasses, but there were none nearby.

Near Bani Rizam, 18 km north of Abha, off the Taif road; on a barren rocky hillside. 7,500 ft.

***Striga gesnerioides*** ◆

An erect sometimes branching leafless root parasite to 30 cm high; pale pink flowers 6 mm wide, in spikes; no scent. Parasitic on *Euphorbia* spp. often *E. inarticulata*. Widespread in the south.

Between Mudhaylif and Muhayl on the Jiddah-Jizan road; on a wide shrubby plain. 1,200 ft.

Striga hermonthica ♦

An erect branching leafy herb 45 cm high; bright pink flowers 2.5 cm wide, in spikes; no scent. Root parasite on *Sorghum*. Locally abundant.

Near Ad Darb, on the Jizan-Abha road; among *Sorghum* plants in a roadside field. 100 ft.





Verbascum bottae ♀

An erect herb with several stems to 75 cm high and a leafy base with shiny serrated leaves; yellow flowers 3 cm wide; no scent.

Wadi al Uss, on the western side of Jabal Sawdah, NW of Abha; among river boulders near the Police Post. 3,200 ft.

Verbascum longibracteatum ♀

A stout erect herb with a basal rosette of glabrous leaves; flower stems 60 cm high with long slender bracts; yellow flowers 2 cm wide. Locally abundant.

Jabal Sawdah, 28 km NW of Abha; near the lip of the escarpment. 9,200 ft.



Verbascum decaisneanum ♀

A shrublet 30 cm high, the leaves and flower stems glabrous; yellow flowers 1 cm wide with reflexed petals and yellow hairy filaments, in spikes.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; on a rocky spur. 5,500 ft.





◆ ***Verbascum melhanense***

An erect herb 1 m high with a leafy base and shiny serrated leaves; yellow flowers 1.8 cm wide with a red spot on each of the two upper petals; no scent.

Tannumah, a watered valley 12 km south of An Nimas, Taif-Abha road; near the stream. 6,500 ft.



◆ ***Verbascum schimperianum***

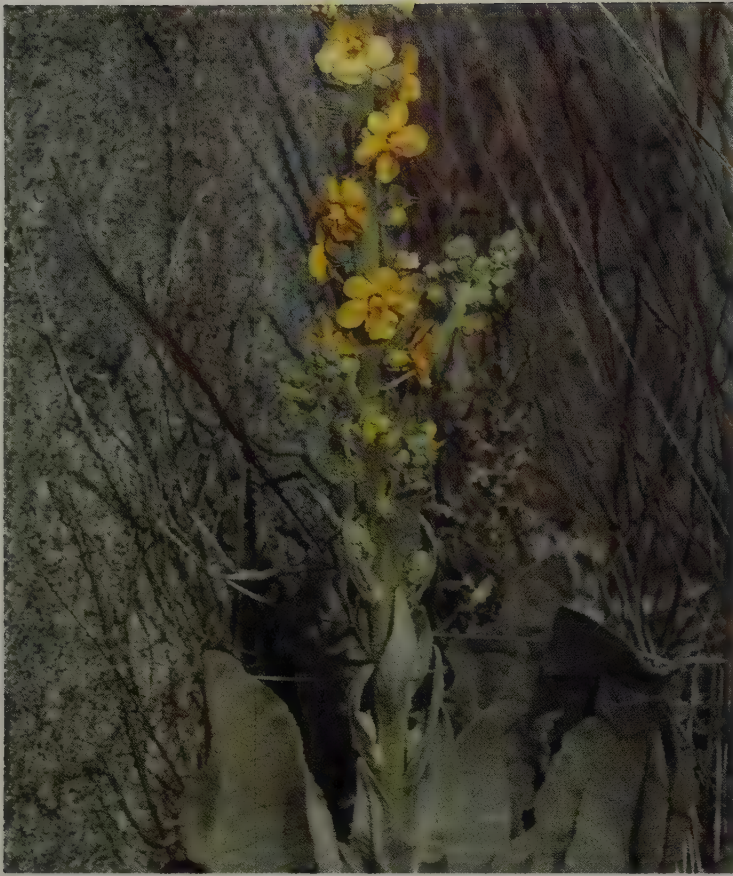
A many-branched erect herb 45 cm tall with thick gritty yellowish leaves, the margins plicated; yellow flowers 1.5 cm wide with reddish filaments.

Wadi Sawawin, 75 km SW of Tabuk; in hard sand at base of a steep hill. 2,000 ft.



◆ ***Verbascum nubicum*** ◆

A stout erect herb 45 cm high with a leafy base and downy leaves; yellow flowers 1.5 cm wide. Near Al Hadda, off the Jiddah-Taif road; among granite rocks near the escarpment. 6,300 ft.



Verbascum sinaiticum ◆

A stout slightly branching erect herb 1 m high with downy leaves; yellow flowers 1.5 cm wide.

Headwaters of Wadi Qaraqir, 75 km SE of Sawawin, in a hanging valley in the sandstone buttes; in hard sand. 3,500 ft.



***Verbascum* sp. nov.** ◆ ◆

An erect herb 35 cm high with a basal rosette of rather narrow white-woolly leaves; yellow flowers 1.2 cm wide, on long pedicels.

Along a new road to the escarpment lip 70 km south of Abha, off the Najran road; at the base of a small rocky outcrop, near cultivation. 7,000 ft.



◆ ***Verbascum yemensense***

A stout erect herb 1 m high with several stems from a leafy base, the leaves glabrous above and white granular below; yellow flowers 1.5 cm wide.

A red granite mountain 50 km south of Baljurshi, Taif-Abha road; in granite sand, by the roadside. 6,500 ft.

Veronica anagallis-aquatica ◆

A grazed leafy branching herb 20 cm high; pale blue flowers 6 mm wide. A widespread plant near water.

The waterfall beauty-spot between Abha and Jabal Sawdah; by the edge of the stream. 8,500 ft.

***Verbascum* sp.** ◆

A very bushy herb 45 cm tall and 1 m wide with pale creamy granular-hairy leaves and stem; yellow flowers 7 mm wide with reflexed petals having a crimson mark at the base and crimson hairy filaments, in spikes.

Jabal Radwa, a 7,500 ft granite massif 70 km north of Yanbu; on a rocky hillside. 4,300 ft.

Veronica beccabunga ◆

A delicate herb 5 cm high; pale blue flowers 6 mm wide.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; in damp sand by a stream in a hanging valley. 5,200 ft.





***Veronica cymbalaria* ◆**

A semi-prostrate herb with leafy stems 18 cm long; tiny white flowers 2 mm wide.

Top of the escarpment, Jiddah-Taif road; in a shady crevice behind the Police Post. 6,000 ft.



***Veronica opaca* ◆**

A semi-prostrate leafy herb with stems 15 cm long; pale blue flowers 4 mm wide. A fairly widespread weed.

Near Al Hadda, off the Jiddah-Taif road; in an irrigated orchard. 6,500 ft.

SELAGINELLACEAE

This family of clubmosses belongs to the class Lycopsidea, some of whose members grew as large trees in the Carboniferous period and carpeted large land surfaces. But the present day *Selaginella* species are all small herbs; those species occurring in Saudi Arabia have slender branching stems bearing leaves in four rows; the lateral ones are larger, which gives the plant its

characteristic flattened form. The genus has been included here because, to the layman, the species are very like ferns. *Selaginella* produces sporangia in small cones and there are two different types of spores, minute microspores and the larger female megaspores.



***Selaginella imbricata* ◆**

A tufted herb; very bright green fronds with a blue sheen.

44 km north of Muhayl on the Jiddah-Jizan road; in a crevice among granite boulders. 1,200 ft.



***Selaginella yemensis* ◆**

A prostrate branching herb with fronds 3 cm long and brown scales on the stem.

Wadi al Uss, on the western slope of Jabal Sawdah (NW of Abha), just below the Police Post; in a damp shady crevice. 3,200 ft.

SOLANACEAE

This large family of some 3,000 species is one of the most important to mankind, producing food plants such as potatoes, tomatoes and chillies; others contain alkaloids used in medicine and the family also includes the popular yet harmful tobacco plant, *Nicotiana tabacum*. Most Arabian species, especially *Datura*, are highly poisonous to man and even the foliage is not

grazed; however, *Lycium shawii* has edible fruits and its leaves are grazed. The flowers are variable in appearance and those of *Hyoscyamus* greatly resemble certain members of the Scrophulariaceae.



Datura fastuosa ◆

A leafy shrubby herb to 2 m tall; white trumpet-shaped flowers 6 cm wide; pale green warty pendent fruits 2 cm wide.

Jabal Fayfa, 100 km NE of Jizan; near Suq Ayban, on sandy bank of wadi. 1,000 ft.



◆ ***Datura innoxia***

A branching very leafy herb 60 cm high with dark green entire leaves; white trumpet flowers 4 cm wide; sour smell; very spiny pendent fruits. A fairly widespread plant, especially in the lowlands.

One-third of the way up the escarpment, Jiddah-Taif road; in a rocky gully. 3,500 ft.



◆ ***Hyoscyamus albus***

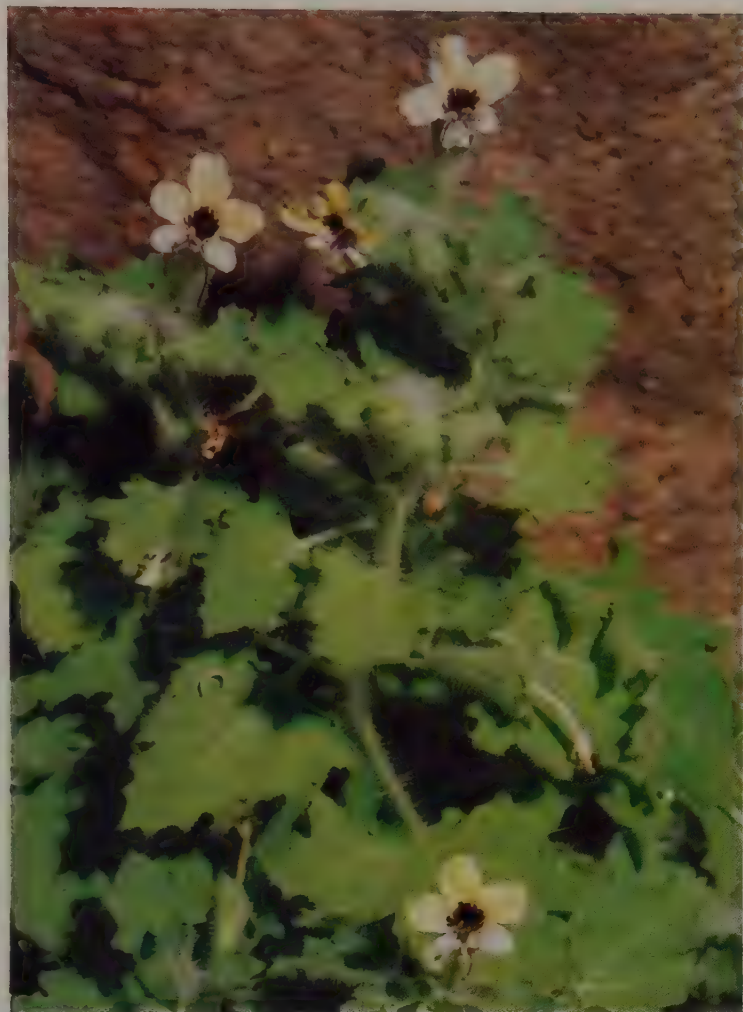
A very leafy branching herb 60 cm high with entire leaves; creamy flowers 1 cm wide with a pale green throat; sour smell. Locally fairly common.

Wadi Kharar, near the foot of the escarpment, Jiddah-Taif road; in a granite ravine among rocks. 1,500 ft.

◆ ***Datura stramonium***

A branching very leafy herb 60 cm high with bright green unevenly lobed leaves; white trumpet flowers 3.5 cm wide with twisted 'lobe-tips'; erect spiny fruits. A very widespread plant in the mountains.

Near the university, Abha-Khamis Mushayt road; near a sewage outfall. 6,000 ft.



Hyoscyamus cf. aureus ◆

A bushy leafy herb 45 cm high with soft wide dentate leaves having a wavy margin; creamy-white flowers 1.3 cm wide with a deep purple throat, cupped in a large calyx; no scent.

20 km north of Shiqri on the road to Tabuk; on a ledge of a red sandstone butte. 3,100 ft.



Hyoscyamus desertorum ◆◆

A branching herb with ascending stems 22 cm long, the stems and upper surface of the leaves slightly hairy, the under surface glabrous and the margins slightly lobed; pale yellow flowers 2 cm wide with a brownish throat, cupped in a small, slightly toothed calyx; no scent.

Near Turayf Camp, (31° 40'N, 39° 29'E); in shallow sand over limestone plateau. 2,900 ft.



◆ ***Hyoscyamus muticus***

A bushy leafy herb 1 m tall with wide abruptly pointed glaucous leaves; green flowers 2 cm wide densely blotched with purple and barely clearing the large calyx; no scent; the calyces enlarge greatly in fruit.

Tabuk, near the sewage overflow SW of town; in hard sand. 2,500 ft.



***Hyoscyamus* sp. ◀▶**

A bushy leafy herb to 60 cm high with intensely wet-sticky glandular foliage and with arching flower stems; pale yellow flowers 1.5 cm wide with small brownish marks in the throat, cupped in a large toothed calyx; no scent. Locally common.

Harrat Khaybar Camp (25° 41'N, 39° 57'E), near the airstrip; along the edge of the lava flow. 5,800 ft.

◆ ***Hyoscyamus pusillus***

A spreading leafy herb with upward-curving stems to 30 cm long; yellow flowers 1 cm wide with a deep purplish throat, cupped in a very large calyx. In scattered localities in the north. Variable; the plant is sometimes dwarf, with narrow lobed leaves, smaller calyx and flowers.

25 km north of Qiba and 100 km north of Buraydah; in a sandy wadi near the shallow limestone escarpment. 1,500 ft.





Lycium* sp. nov. aff. *depressum ◆

A tangled leafy shrub nearly 3 m high, forming a dense thicket; long arching stems with flowers at the apex of the young shoots; white flowers 6 mm wide with strongly reflexed lobes and a very short corolla-tube only 2 mm long; no scent.

Wadi Sabha, near Zabirah, 200 km north of Buraydah; in a sandy wadi near the edge of the limestone plateau. 1,800 ft.

Lycium* sp. aff. *depressum ◆

A dense leafy shrub 2 m high forming a large thicket; white flowers 8 mm wide, with a short corolla-tube 7 mm long; no scent.

Wadi Sabha, near Zabirah, 200 km north of Buraydah; in a shallow wadi on the limestone plateau, 1,800 ft.



Lycium shawii ◆

A leafy shrub 1.5 m high; pale blue flowers 5 mm wide and 1.5 cm long, including the calyx; edible orange berries. A very widespread, somewhat variable plant; flowers sometimes white.

40 km NNW of Najran, on the Abha road; among rocks. 6,000 ft.





Solanum albicaule ▲



Solanum grossedentatum ▲



Solanum coagulans ▲



Solanum incanum ▲

◆ ***Solanum albicaule***

A densely thorny bushy shrublet 1 m high; lilac flowers 1.2 cm wide with narrow often strongly reflexed petals; no scent.

One-third of the way up the escarpment, Jiddah-Taif road; in a small rocky ravine. 3,500 ft.

◆ ***Solanum coagulans***

A bushy leafy slightly spiny herb 60 cm high; bright lilac flowers 1.5 cm wide. The small spines on the calyx enlarge when the fruit sets. Widespread around Jiddah.

At the junction of the Makkah By-Pass with the Makkah road, towards Taif; in hard sand. 1,000 ft.

◆ ***Solanum grossedentatum***

A slightly hairy branching herb 30 cm tall with lobed leaves; white flowers 1 cm wide; orange ripe fruits. Locally abundant.

Jabal Sawdah, 28 km NW of Abha; among rocks near the lip of the escarpment. 9,000 ft.

◆ ***Solanum incanum***

An erect bushy leafy shrublet 1 m high and slightly spiny, some of the spines being on the mid-rib of the grey-green velvety leaves; pale lilac flowers 2.8 cm wide; large smooth round pale yellow fruits. Widespread in the Asir and south Hijaz.

Wadi Liyyah, near the Sudd Samallaqi Dam, 30 km south of Taif; on a dry rocky hillside. 5,500 ft.

◆ ***Solanum macracanthum*** ◆

An erect slender-stemmed spiny shrub 1.5 m tall, sparsely branching and with a few spines on the mid-ribs of the leaves; lilac flowers 1 cm wide, the petals not reflexed; orange fruits.

Tannumah, 12 km south of An Nimas, Taif-Abha road; among shrubs on bank of stream. 6,500 ft.



◆ ***Solanum schimperianum*** ◆

An erect woody shrublet 1.25 m high; pale lilac flowers 1.5 cm wide; faint sour smell; bright scarlet fruits. Locally widespread.

20 km NW of Abha, on the road to Jabal Sawdah; by the roadside. 8,800 ft.

◆ ***Solanum sepicula*** ◆

A grazed bushy very thorny shrublet 25 cm high; lilac flowers 1.5 cm wide with strongly reflexed petals; no scent; orange fruits. Fairly widespread in the Asir and south Hijaz.

Wadi Liyyah, near the Sudd Samallaqi Dam, 30 km south of Taif; on a rocky hillside. 5,500 ft.





Solanum villosum ◆◆

A soft-hairy bushy leafy herb 30 cm high; white flowers 8 mm wide, the reflexed petals hairy on the outside; no scent. Variable and with a wide range; the northern form has smaller dentate leaves.

Wadi al Uss, NW of Jabal Sawdah, near Abha, 2 km below the Police Post; in hard sand on edge of shrubby patch. 3,200 ft.



Solanum surratense ◆

A dwarf spreading white-spiny leafy herb 15 cm high; lilac flowers 2 cm wide; small hard yellow fruits 1.2 cm wide; no scent.

Jabal Fayfa, 100 km NE of Jizan; near Suq Ayban, by the roadside. 800 ft.

Solanum villosum* ssp. *punicium ◆

A bushy leafy almost glabrous herb 35 cm high; pale lilac flowers 1 cm wide with purple stripe down the centre of each petal; orange fruits; no scent. Locally widespread.

5 km SW of Al Hadda, on the Jiddah-Taif road; near cultivation. 6,500 ft.



Solanum* sp. aff. *villosum ◆

An erect juicy leafy slightly hairy branching herb 45 cm high; small white flowers 5 mm wide; no scent.

Wadi al Uss, on the western slope of Jabal Sawdah, NW of Abha, near the Police Post; in the shade of *Ficus* trees. 3,200 ft.

***Withania somnifera*** ◆

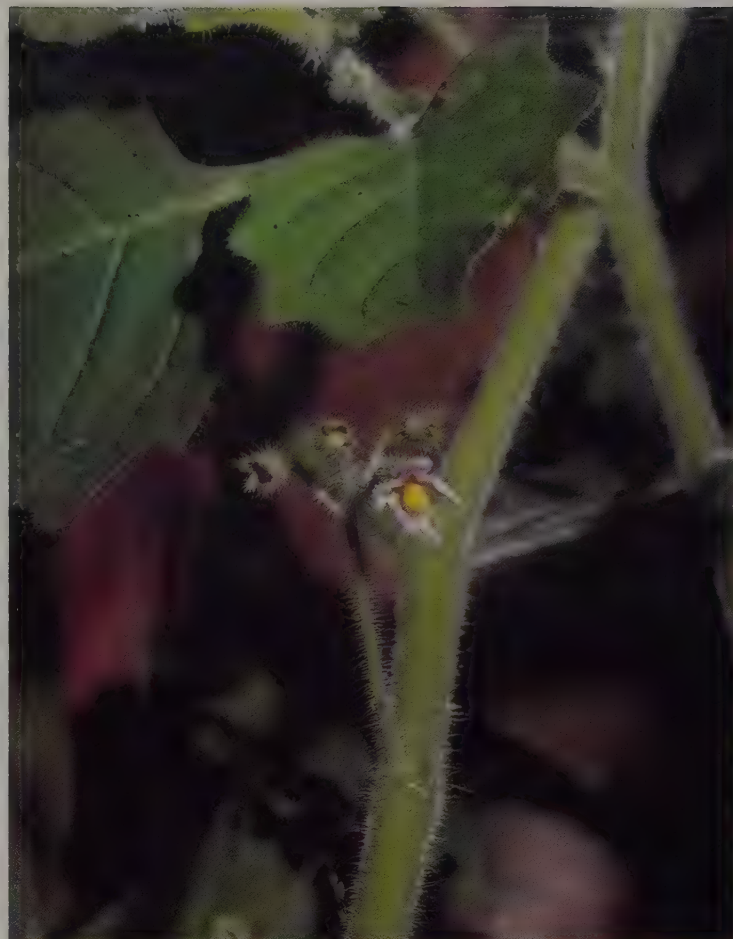
A branching leafy slightly downy shrublet 1 m high; green flowers 4 mm wide; the bright red ripe berry is enclosed in a persistent papery calyx. A very widespread plant.

Near the head of Wadi Khulays, 100 km NE of Jiddah; near a date grove. 700 ft.

***Solanum* sp.** ◆

A very leafy branching herb with stems 40 cm long and covered with coarse white hairs; white flowers 8 mm wide, striped with lilac and with reflexed petals.

Near the Police Post NNW of Najran, Abha road; in a sand-pan by the road-side. 6,200 ft.



STERCULIACEAE

This family, occurring chiefly in the tropics, yields two economically important products, cola and cocoa, but the three genera found in western Saudi Arabia have no economic use. Three of the seven species bear flowers widely different in appearance; *Melhania muricata* has tiny flowers enclosed by

three large fused epicalyx lobes forming a lantern shape, whereas the flowers of *M. ovata* have five relatively large free petals. The flowers of *Glossostemon* are a brilliant red, a colour seldom seen in Saudi Arabia, and many of the filaments are petaloid.



Glossostemon bruguieri ◆

A leafy thick-stemmed herb 60 cm tall with relatively huge rugose coarse-hairy leaves 23 cm wide; bright red flowers 2 cm wide; no scent.

25 km NW of Nuqra, between Madinah and Qassim; in a gravelly run-off on a sandy plain. 2,500 ft.

Melhania* sp. aff. *muricata ◆

A small grazed woody-based herb 4 cm high with narrow leaves; tiny greenish flowers enclosed in three pale reddish green lantern-like epicalyx lobes 1 cm wide; no scent.

Near Jabal Manfah, 50 km NNW of Najran; among small shrubs in a shallow run-off on a sandy plain. 6,200 ft.



Melhania incana ◆

An erect branching herb 1 m tall with large downy coarsely dentate leaves; yellow flowers 2.2 cm wide; no scent.

Jabal Fayfa, 100 km NE of Jizan; on an earthen bank, by roadside. 5,000 ft.





Melhania ovata ◆

A grazed leafy woody-based 'cushion' plant 10 cm high and 30 cm wide; bright yellow flowers 2 cm wide; no scent. Very widespread in the Asir and the south Hijaz especially near the lip of the escarpment.

Near the King's Palace south of Abha; on the lip of the escarpment, among rocks. 7,000 ft.



Melhania philippisae ◆

An erect leafy woody-based herb 1 m high with thick downy grey-green leaves; pale yellow flowers 1.5 cm wide surrounded by three large golden epicalyx lobes 3 cm wide; aromatic. The plant, when not in flower, resembles an *Abutilon* with which it often grows.

One-third of the way up the escarpment, Jiddah-Taif road; on a rocky hillside. 3,500 ft.



Melhania velutina ◆

An erect sparsely branching woody herb 30 cm tall with oval dentate leaves covered in red downy hairs; in bud and fruit, the yellow buds 1 cm wide.

Jabal Fayfa, 100 km NE of Jizan; on steep rocky hillside. 4,000 ft.



Waltheria indica ◆

A grazed shrubby leafy herb with woody base and stems to 25 cm long; yellow flowers 5 mm wide with strongly reflexed petals, in crowded axillary clusters; no scent.

Grandi Lavori road, 25 km from its junction with Jiddah-Jizan road; in granite sand under acacias. 2,500 ft.

TAMARICACEAE

This family has only four genera world-wide and many species grow in maritime or sandy places and are known as halophytes, being tolerant of saline soils. Many species within *Tamarix* are difficult to classify, so several of the specific names suggested

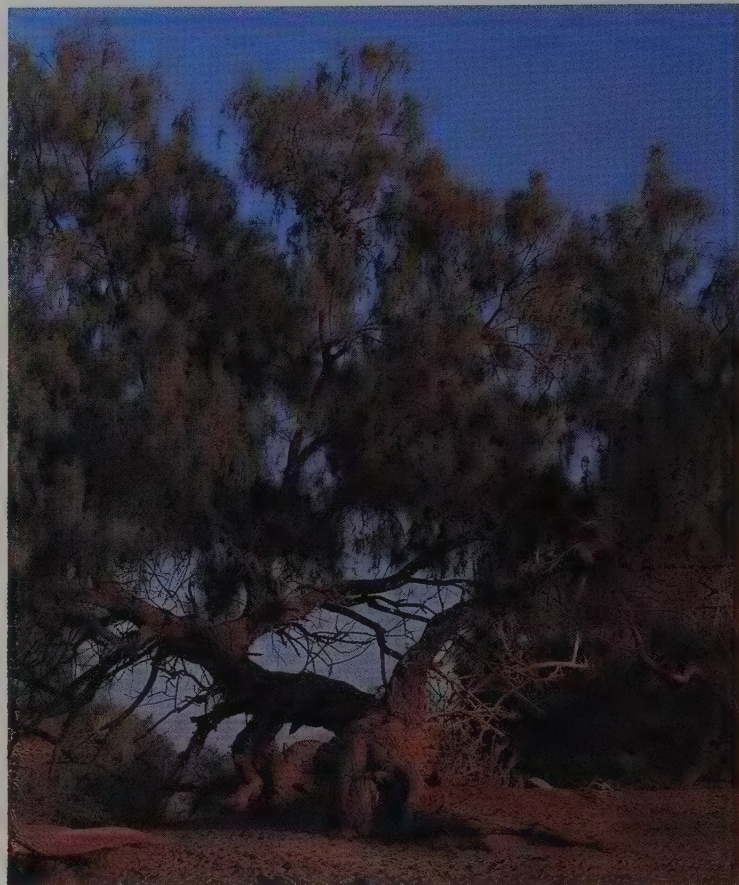
here are somewhat tentative. *Tamarix* species tend to have slender branches which are green, and the leaves are tiny and scale-like. The flowers are either solitary, as in *Reumuria hirtella*, or in a dense spike or raceme as in *Tamarix*.



Reumuria hirtella ◆

A bushy herb 15 cm high with small blue-green leaves wet to the touch because of salt crystals; solitary creamy flowers 1 cm wide with lilac anthers; no scent. The flowers, though terminal, are grouped in a leafy spike.

Summit of Jabal al Tayran, overlooking the Gulf of Aqaba; on limestone. 2,200 ft.



Tamarix aphylla ◆ ◆

A stout slightly sprawling tree 12 m high; pale pinkish white flowers 2 mm wide arranged spirally along a spike. The tree appears very leafy but the 'leaves' are green stems. Widespread along sandy wadis, especially in the hills.

Near Wadi Halahila, 60 km NNW of Najran, off the Abha road; in a sandy wadi. 4,500 ft.





Tamarix arabica ◆

A leafy shrub 2 m tall with very branching grey-green stems; pale pink flowers 2 mm wide, in spikes; sweet scent.

Near Riyadh, on the road to Hair; along the margin of a sewage ditch. 2,000 ft.



Tamarix aucheriana ◆

An erect shrublet 60 cm high with tiny leaves; deep rosy-pink flowers 8 mm wide, in terminal spikes; faint scent.

Dumat al Jandel, 26 km from Al Jawf; near a saline lake. 1,000 ft.



◆ *Tamarix macrocarpa*

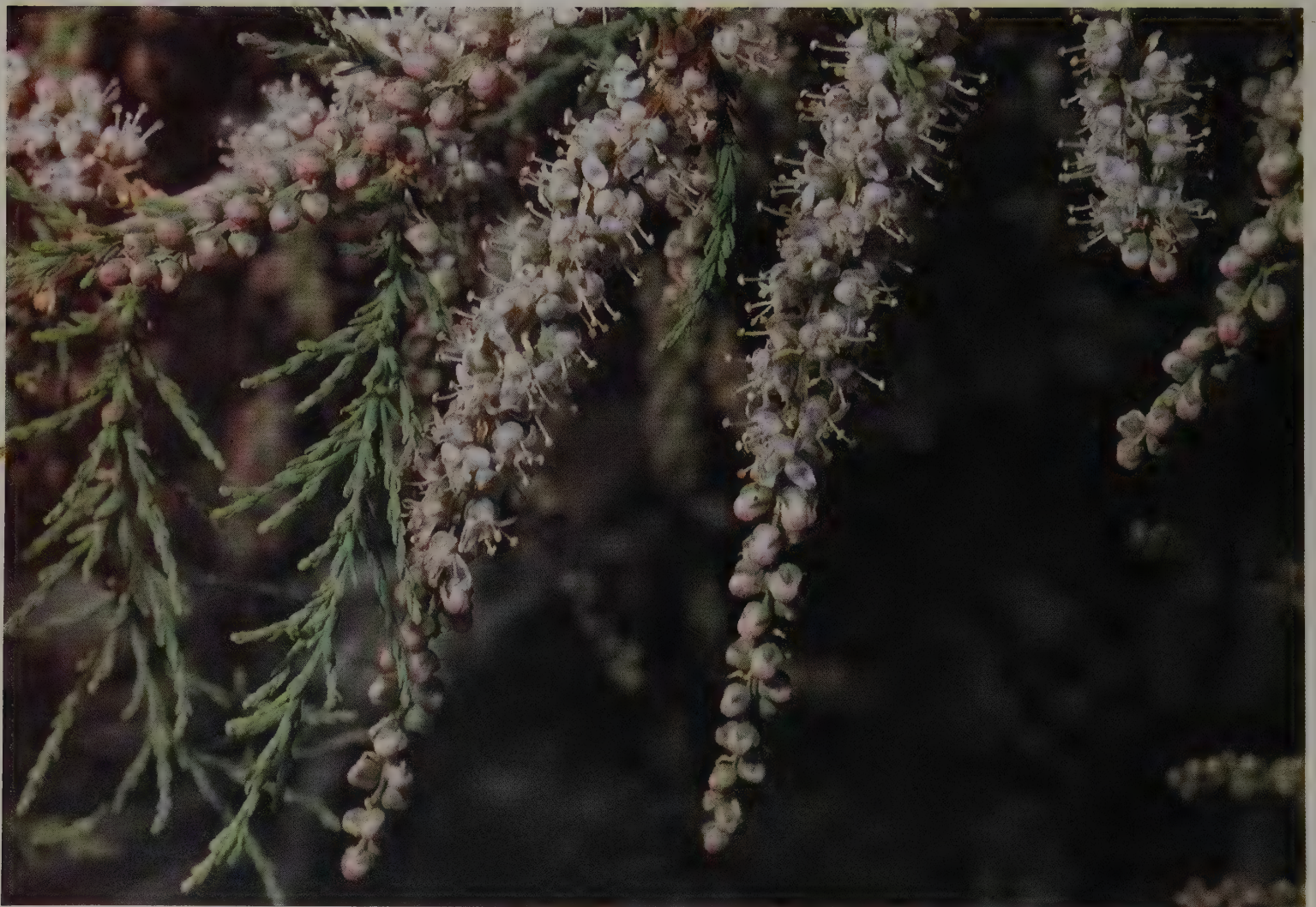
A slender bushy tree to 5 m tall with very bright green young stems; white flowers 8 mm wide, in large spikes; no scent. Locally widespread.

Wadi Habaqah, 32 km south of Baljurshi; lining the stream in a rocky ravine. 6,100 ft.

◆ *Tamarix szovitsiana*

A grazed shrub 1 m high and 2 m wide with very bright green leaves; pale pink flowers 4 mm wide, crowded into dense spikes; sweet scent.

12 km west of Turayf Camp (31° 40'N, 39° 29'E); at edge of claypan, on a small mound. 2,900 ft.



THYMELAEACEAE

This is a small family though fairly cosmopolitan and it is well represented in Africa. However, only three species occur in Saudi Arabia and the species of two *Daphne* have been collected only from two localities. These have flowers grouped in a raceme, whereas those of *Gnidia* are arranged in a head.

Daphne linearifolia ◆

A graceful narrow-leaved shrub 1.25 m high with pale stems; cream or white flowers 6 mm wide with rounded petals; strong sweet scent. Summer flowering. Locally fairly abundant.

Jabal Dabbagh, a 7,500 ft. granite massif 88 km SW of Tabuk; in a hanging valley, on granite. 5,500 ft.



Gnidia somalensis ◆

A perennial bushy leafy herb with flower stems to 20 cm high; crowded yellow flowers 2 mm wide, in flat heads cupped by large green bracts; sour smell and seldom grazed. Widespread between Abha and Najran.

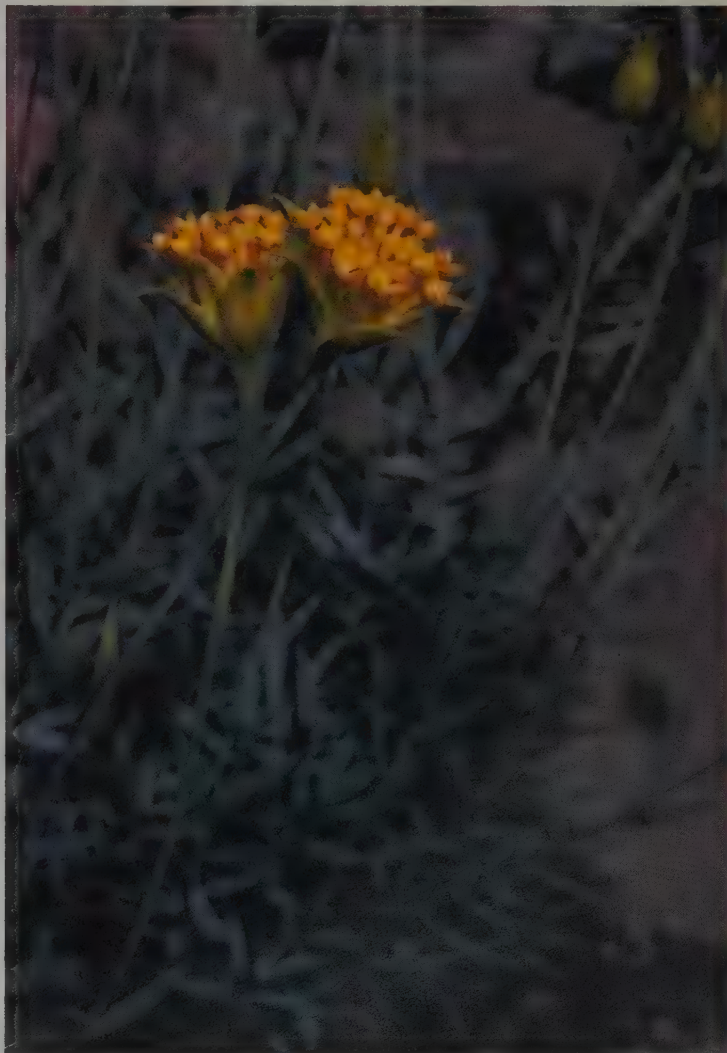
Near Suq al Ithnayn, 58 km SE of Abha; on a sandstone plateau. 7,900 ft.



Daphne mucronata ◆

A many-branched shrub 1.5 m tall with alternate pale bluish-green narrow leaves; in old fruit, a pointed black seed on a red fleshy base, cupped in a four-petalled bulbous calyx 5 mm wide; sour smell.

Jabal Warjan, a 6,700 ft. granite massif 60 km SW of Madinah; in a wooded ravine on the north side. 5,500 ft.



TILIACEAE

This is a fairly small family but it is widely distributed, especially in the tropics, and many species are trees, the lime or linden being perhaps the best known in Europe. The species found in Saudi Arabia are herbs, shrubs and small trees, and they occur mainly south of Madinah. A close relative of *Corchorus*

trilocularis is *C. capsularis*, which has bast fibres that yield jute, and indeed a poor quality cloth is sometimes prepared from fibres of the former species, mainly in Egypt. The species of *Triumfetta* are evening flowering.



Corchorus trilocularis ◀

An erect leafy herb 35 cm tall; bright yellow flowers 6 mm wide. Locally widespread; in exposed places the plant is semi-prostrate.

Wadi Kharar, a granite ravine at the foot of the escarpment, off the Jiddah-Taif road; on a rocky hillside. 1,500 ft.



◆ ***Corchorus antichorus***

A woody-based many-branched prostrate leafy herb; yellow flowers 5 mm wide. Evening flowering. Locally widespread in hard sand.

Low rocky hills, 10 km east of Jiddah; in hard sand in a small wadi. 80 ft.



◆ ***Corchorus olitorius***

A leafy herb 75 cm tall with large dentate leaves extended into two 'horns' at the base of the blade; yellow flowers 7 mm wide; stout erect ridged fruits.

Abu Arish; edge of cornfield in town. 300 ft.



◆ ***Grewia erythraea*** ◆

An erect grazed leafy shrub 1 m high with birch-like leaves; ripe fruits orange, in clusters of three or four. Locally fairly abundant.

Low rocky hills, 10 km east of Jiddah; among rocks. 80 ft.



◆ ***Grewia* sp. aff. *erythraea***

A bushy shrub 1.5 m tall with very pale green soft leaves; white flowers 1.4 cm wide. Locally fairly widespread.

83 km ESE of Al Bahah and 72 km west of Bishah; among granite blocks on a tonalite mountain. 5,500 ft.



◆ ***Grewia mollis***

A very leafy shrubby tree 5 m high with glabrous green leaves; yellow flowers 2 cm wide; no scent. Easily confused with *G. velutina*.

Halfway down the Grandi Lavori road, 5 km south of Baljurshi; in a rocky ravine. 4,000 ft.



Grewia tembensis ◀

A slender-stemmed leafy bushy tree 4 m high; white flowers 1.6 cm wide with deep pink filaments; no scent. The pink filaments seem to be an easy guide to the identification of this species.

Halfway down the Abha-Jizan road; in a narrow rocky ravine. 4,500 ft.



Grewia velutina ◀

A slender-stemmed leafy shrub 3 m high with pale green downy leaves and young stems; yellow flowers 1.5 cm wide; no scent. Easily confused with *G. mollis*.

10 km south of Jabal Abu Hassan, to the west of the escarpment between Abha and Najran; in a rocky wadi. 3,000 ft.



Grewia tenax ◀

A grazed shrubby tree 3 m tall with small round dentate leaves; white flowers 1.5 cm wide. Fairly widespread in the lowlands.

44 km north of Muhayl, on the Jiddah-Jizan road; on a low rocky outcrop. 1,200 ft.



Grewia villosa ◀

A grazed leafy shrub 2 m high with hazel-like leaves; deep orange-brown flowers 8 mm wide; clusters of hard round hairy fruits; no scent.

Halfway down the escarpment, Abha-Jizan road; on a steep rocky hillside. 4,500 ft.



***Grewia* sp. 3220** ◆

A thin straggly shrub 3 m high with slightly granular leaves; white flowers 8 mm wide; no scent.

5 km SW of Al Hadda, off the Jiddah-Taif road; on a rocky hillside. 6,500 ft.



***Grewia* sp. 2104** ◆

A grazed bushy tree 5 m high with glabrous leaves; white flowers 1.2 cm wide; no scent.

Wadi al Uss, on the western slope of Jabal Sawdah, NW of Abha, near the Police Post; among rocks. 3,200 ft.



***Grewia* sp. 3273** ◆

A slender-stemmed shrub 2 m tall with fairly large dentate leaves; white flowers 1.8 cm wide with white filaments. Fairly widespread locally.

Jabal Fayfa, 100 km NE of Jizan; among shrubs on a well-vegetated hillside. 5,000 ft.



Triumfetta flavescens ◆

A woody herb with large leaves and slender arching stems 1 m long; yellow flowers 8 mm wide with brownish sepals, in spikes; the fruits have little hooks making them very 'sticky'. Evening flowering. Widespread in scattered localities.

One-third of the way up the escarpment, Jiddah-Taif road; on a rocky hillside. 3,500 ft.



Triumfetta rhomboidea ◀

A leafy branching herb 1.5 m tall with large soft leaves; dying yellow flowers 5 mm wide, in clusters along a spike; globular hairy fruits 3 mm wide with hooked bristles.

Jabal Fayfa, 100 km NE of Jizan; by roadside, near houses. 5,000 ft.



▶ ***Triumfetta heterocarpa***

A leafy woody-based herb with small leaves and stems 20 cm long; yellow flowers 1.2 cm wide, in spikes; no scent. Evening flowering.

Halfway down the escarpment, Abha-Jizan road; in a narrow rocky ravine. 4,500 ft.



Triumfetta* sp. aff. *rhomboidea ▶

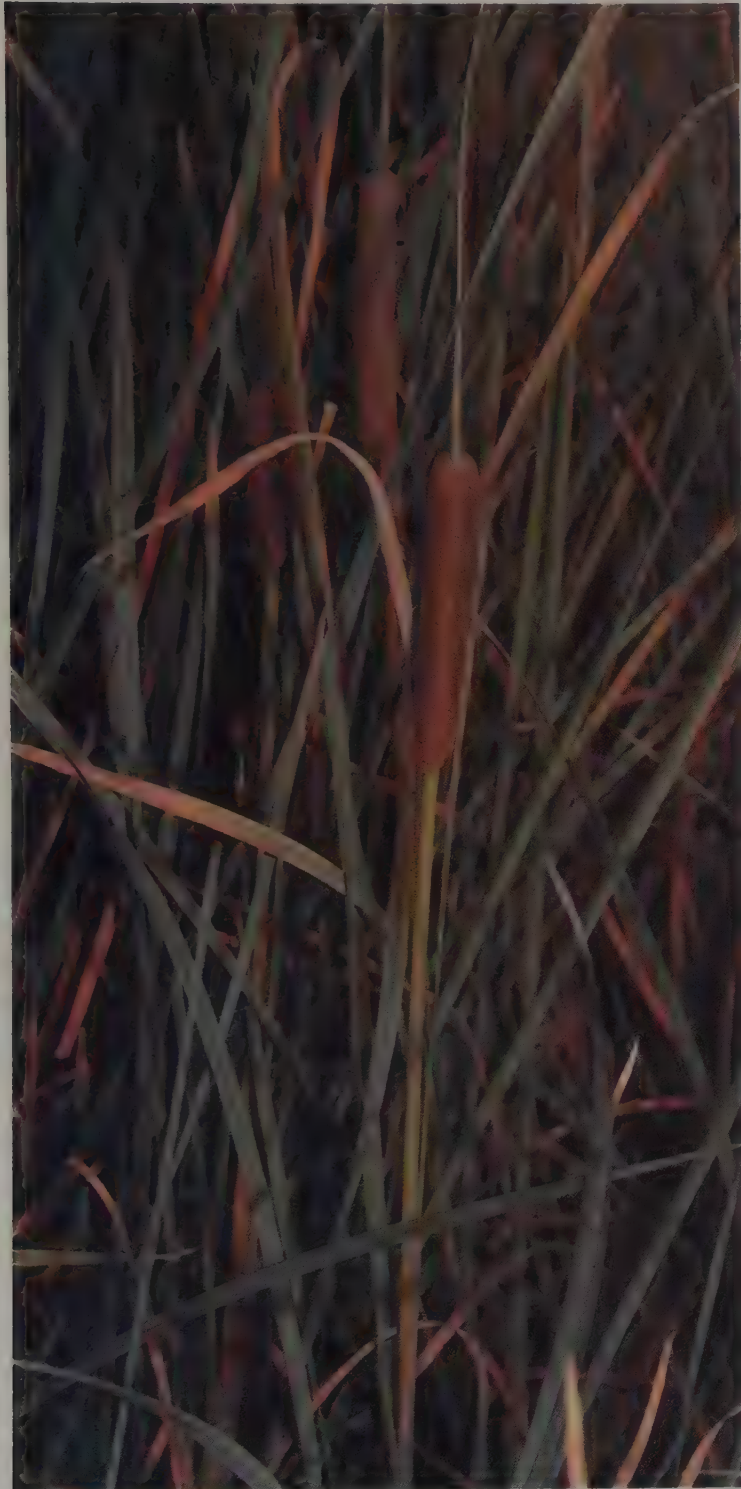
A densely twiggy shrublet 1 m tall with small cordate leaves having a finely dentate margin; yellow flowers 1 cm wide, the sepals reddish; no scent. Evening flowering.

20 km east of Muhayl, new Abha road; on rocky hillside by road. 2,500 ft.

TYPHACEAE

This family has only one genus, but its fifteen species are found in freshwater habitats over much of the world. They are often wrongly referred to as 'bulrushes'; more correctly they should be called reedmace or cattails. *Typha domingensis*, the species

most commonly found in Saudi Arabia, has unisexual flowers crowded into a characteristic dense club-shaped spike which is interrupted by a short length of stem; the female flowers occur in the lower half of the inflorescence and the male in the upper.



Typha domingensis ◆

A reed-like marsh plant with stems to 2 m high; pale brown flowering heads 14 cm long. Fairly widespread in the south usually in permanent water.

Wadi Najran; a pool in between the town and the New Dam. 4,500 ft.



Typha elephantina ◆

A reed with leaves to 4 m long, the back sharply keeled near the base; flower stem to 3 m long, the female flowers clustered in a spike 35 cm long with the male flowers above, in a spike 32 cm long; there is a gap of varying width between the two groups of flowers.

Jabal Fayfa, 100 km NE of Jizan, between Bani Malek and Suq Ayban; on the sandy bank of the stream, not in water. 1,500 ft.

ULMACEAE

This is a fairly large family of about 2,000 species world-wide, all trees or shrubs. There is only a single representative in Saudi Arabia and, like the willow, it seems to grow mainly near villages

in the southern mountains, though it does not appear to be cultivated.



◆ ***Celtis africana*** ▼

A pollarded slender-branched tree 5 m high; reddish green flowers 5 mm wide; no scent. In scattered localities in the Asir and southern Hijaz.

Tannumah, a watered valley 12 km south of An Nimas; near the stream. 6,500 ft.



UMBELLIFERAE

This is a very large family found in most temperate and some tropical regions of the world. Most species are herbs, but *Pituranthos triradiatus* is so woody as to be almost shrub-like. This family is perhaps the easiest of all to recognise because of its characteristic, almost flat, umbrella-like inflorescence known as an umbel. Often the umbel is compound, that is, formed of several small umbels called umbellules. In some

genera, such as *Eryngium*, *Pycnocycla* and *Centella*, this basic inflorescence can look somewhat different. The almost spherical head of *Pycnocycla*, with its outer fringe of larger petals looks instead very much like a scabious. Many species in Saudi Arabia occur in the north but some are found in the southern mountains, *Ammi* mainly growing in disturbed ground near cultivation.



Ammi majus ◆

An erect branching herb with feathery leaves and stems to 60 cm high; flat umbels of white flowers, each umbellule 8 mm wide; faint scent. A widespread variable herb, often found as a weed.

Near Baljurshi, between Taif and Abha; in a fallow field, by the roadside. 6,500 ft.



Anisosciadium lanatum ◆

A many-branched stemmy herb 30 cm high with carrot-like leaves and ridged stems; flat heads of white flowers with mauve filaments, each umbellule 1.5 cm wide; strong carrot-like smell. The calyx enlarges and becomes spiny in fruit. Very widespread in the north.

Near Uqlat as Suqur, between Madinah and Qassim; on a hard sandy plain. 2,850 ft.

Apium graveolens ◆

An erect branching perennial herb to 1 m tall with a basal rosette of large compound leaves, the rounded leaflets dentate; white flowers in umbels 5 cm wide; fat kidney-shaped fruits with a pale margin; aromatic, like celery. This is wild celery.

Near Tannumah, 12 km south of An Nimas; on shady cliff of waterfall at Al Dhahna. 6,500 ft.





Apium nodiflorum ▲

An erect grazed leafy juicy water plant; loose umbels 6 cm wide of white flowers; no scent.

Tannumah, a watered valley 12 km south of An Nimas, on the Taif-Abha road; in a shallow pool in the river bed. 6,500 ft.



Bupleurum gerardii ▲

A delicate erect herb 7 cm tall with simple grass-like leaves; tiny yellow flowers in lax umbels; no scent.

40 km south of Baljurshi, Taif-Abha road; in granite sand. 6,500 ft.



Bifora testiculata ▲

A slender branched herb to 15 cm tall with deeply dissected leaves; tiny white flowers in a few-flowered umbel 5 mm wide; very pleasantly aromatic; rounded two-part fruits. This is similar to the spice coriander.

Near Al Khadara, off the road 163 km north of Abha; in damp shady soil at margin of wheat field, among *Scandix pecten-veneris*. 7,000 ft.



Centella asiatica ▲

A creeping leafy herb forming dense patches and having cordate wavy-edged leaves 4 cm wide; purplish fleshy flowers 3 mm wide in clusters under the leaves. Summer flowering.

Tannumah, a watered valley 12 km south of An Nimas, on the Taif-Abha road; in damp sand on the river bank. 6,500 ft.



◆ ***Conium maculatum***

A many-branched herb to 2 m tall with dark green dissected leaves; white flowers in umbels 3.5 cm wide; unpleasantly aromatic; narrow ridged fruits.

An Nimas, Taif-Abha road; in waste ground in town centre. 7,000 ft.



◆ ***Ducrosia anethifolia***

An erect branching stemmy herb 1 m high with feathery blue-green leaves; tiny yellow flowers in umbels 10 cm wide; strong unpleasant smell. Locally fairly abundant.

Wadi Sabha, near Zabirah, 200 km north of Buraydah; in a shallow wadi on the limestone scarp. 1,800 ft.



◆ ***Ducrosia cf. flabellifolia***

A stout-rooted leafy herb with flower stems to 15 cm tall and with wide compound leaves; brownish yellow flowers in umbellules 6 mm wide; strong sour smell. Locally widespread.

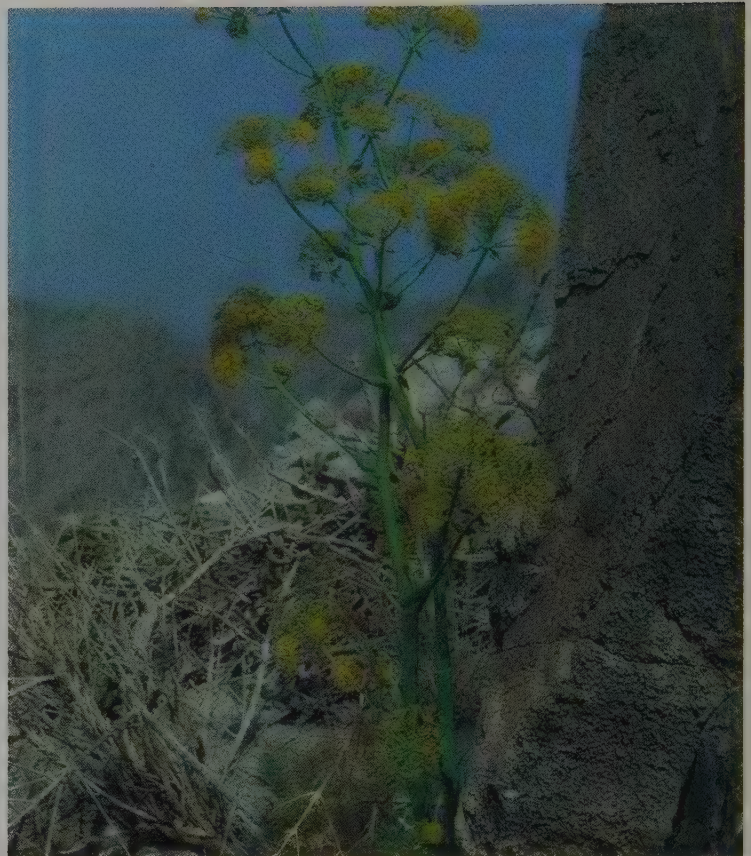
Near Harrat Khaybar Camp, (25° 41' N, 39° 29' E); in volcanic cinders on side of volcano. 5,800 ft.



Eryngium glomeratum ◆

An erect herb to 75 cm tall branching mainly from the base and with very prickly dissected leaves; pale green flowers 1 mm wide with blue anthers, in spherical heads 1 cm wide, and subtended by long spines; faint scent. Locally widespread. Summer flowering.

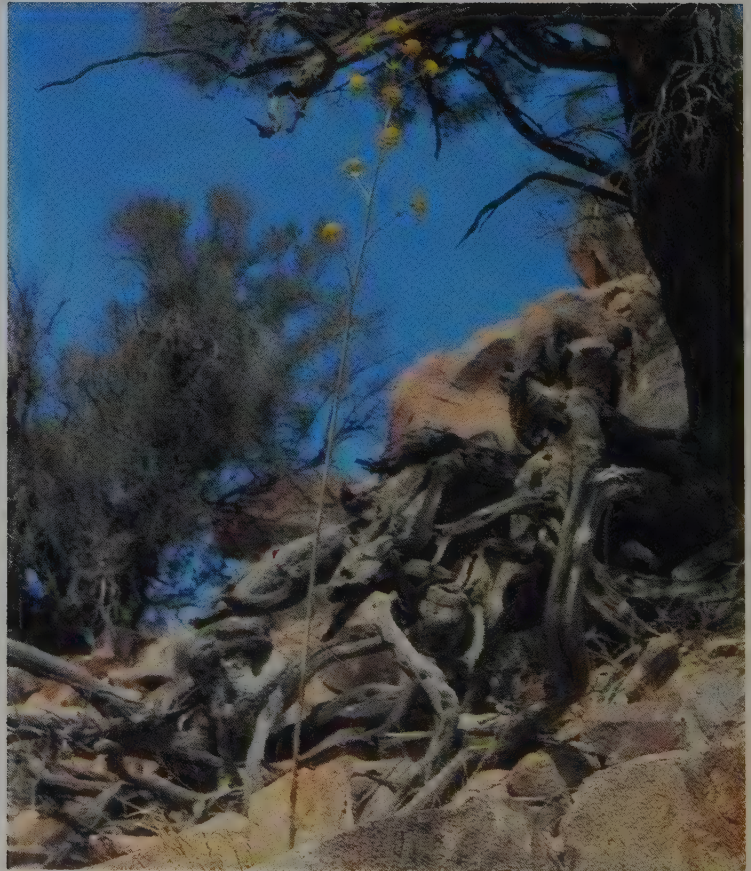
Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; in crevice of andesite spur. 5,000 ft.



Ferula communis ◆ ◆

A branching herb to 1.5 m tall with large feathery basal leaves; yellow flowers 3 mm wide, in large rounded umbels; sour smell. This is a variable species and several populations from Jabal Radwa and Jabal Dabbagh have unbranched stems 3 m or more long with smaller almost completely spherical heads of flowers.

Near the summit of the escarpment, Jiddah-Taif road; on a rocky pinnacle. 6,400 ft.





◆ *Ferula communis* ssp. *glauca*

A leafy-based herb with coarse deeply-dissected leaves and stout branching flower stem 1 m tall; a dead plant, in fruit. Locally widespread.

Near Harrat Khaybar Camp, (25° 41' N, 39° 57' E); on exposed plain among volcanic rocks. 5,700 ft.



◆ *Ferula ovina*

An erect branching leafy herb nearly 1 m high with large papery petioles; rather round umbels 7 cm wide of tiny yellow flowers; aromatic.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; in a granite ravine. 5,500 ft.

◆ *Ferula rutbaensis*

A stout herb with stems to 30 cm tall and with deeply dissected blue-green slightly downy leaves, the base of the petiole having broad purple-edged bract-like wings; yellow flowers 6 mm wide in round umbels; slightly sour smell.

Near Turayf Camp (31° 40' N, 39° 29' E); in shallow sand over limestone plateau. 2,800 ft.



◆ ***Foeniculum vulgare***

A bushy feathery-leaved herb 1 m high; umbels 8 cm wide of yellow flowers; sweetly aromatic. Fairly widespread in the southern mountains, usually near cultivation. The fennel of cultivation.

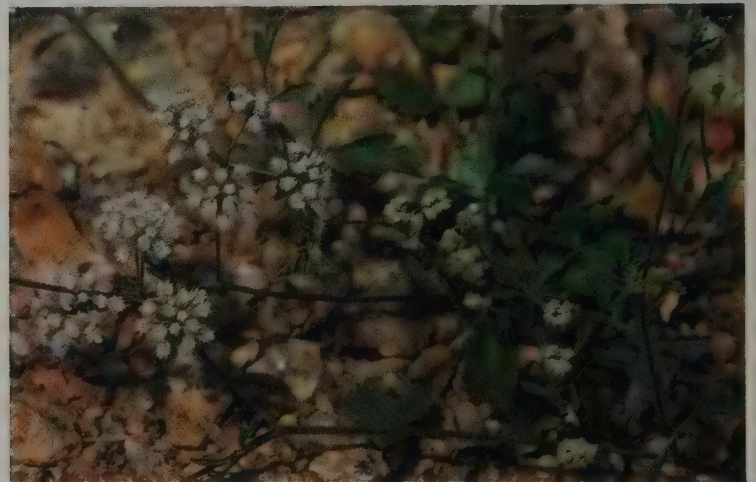
Between Abha and Suq al Ithnayn, near the King's Palace; on a bank by a dry stream. 7,000 ft.



◆ ***Pimpinella cretica* var. *arabica***

A small leafy herb; few-flowered umbels of white flowers; a strong unpleasant smell.

In the Bir al Hamda range overlooking the Gulf of Aqaba; in a shallow wadi, in hard sand. 1,000 ft.



◆ ***Pimpinella* sp. aff. *eriocarpa***

A delicate semi-prostrate parsley-leaved herb with stems to 20 cm long; three or four-flowered umbels 3.5 cm wide of white flowers; no scent.

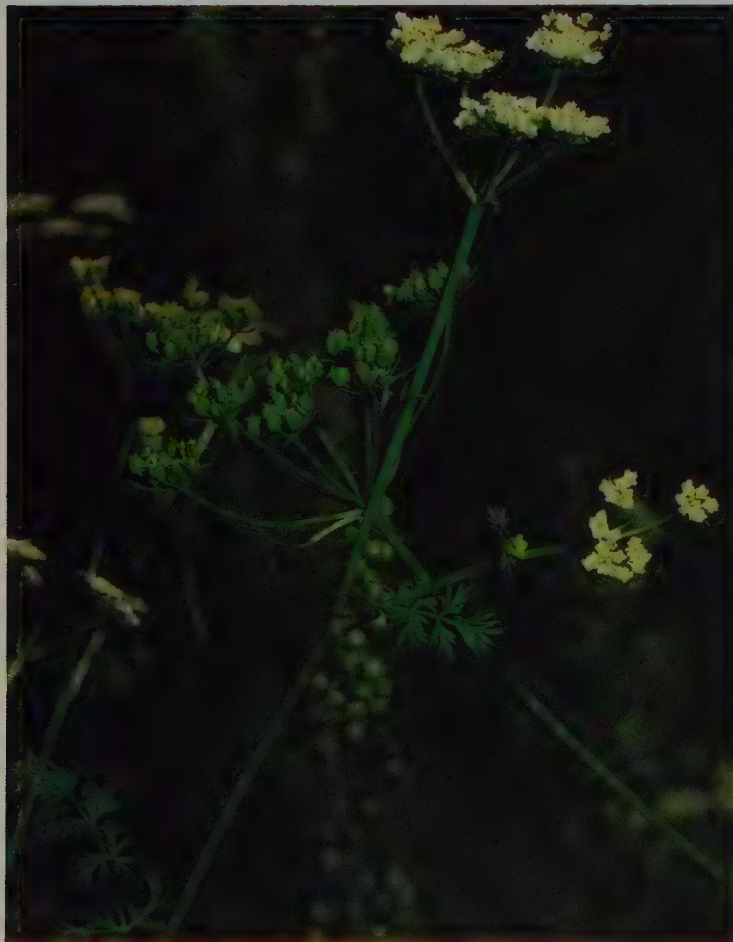
Jabal Qutn, 15 km NE of Uqlat as Suqur; in sand at the base of a granite outcrop. 3,000 ft.



◆ ***Pimpinella eriocarpa***

A slender erect herb 25 cm high with fairly large compound basal leaves; stem leaves slender and parsley-like; white flowers in flat umbels 3 cm wide; no scent.

At the head of Wadi Khulays, 100 km NE of Jiddah; under date palms. 500 ft.



◆ ***Oreoschimperella arabiae-felicis* var. *laevis***

A densely branching bushy herb 1 m tall with finely dissected leaves; white flowers 2 mm wide in small few-flowered umbels 2.5 cm wide which enlarge in fruit; non-aromatic; fat glabrous kidney-shaped fruits.

13 km NW of Abha, Jabal Sawdah road; in shade by well, near cultivated fields. 8,500 ft.

Pimpinella* cf. *schweinfurthii ◆

A slender branching herb to 45 cm high with parsley-like leaves; flat umbels 3.5 cm wide of white flowers; aromatic.

Wadi Kharar, near the foot of the escarpment, Jiddah-Taif road; in a rocky ravine. 1,500 ft.

***Pimpinella* sp. aff. *hirtella*** ▲

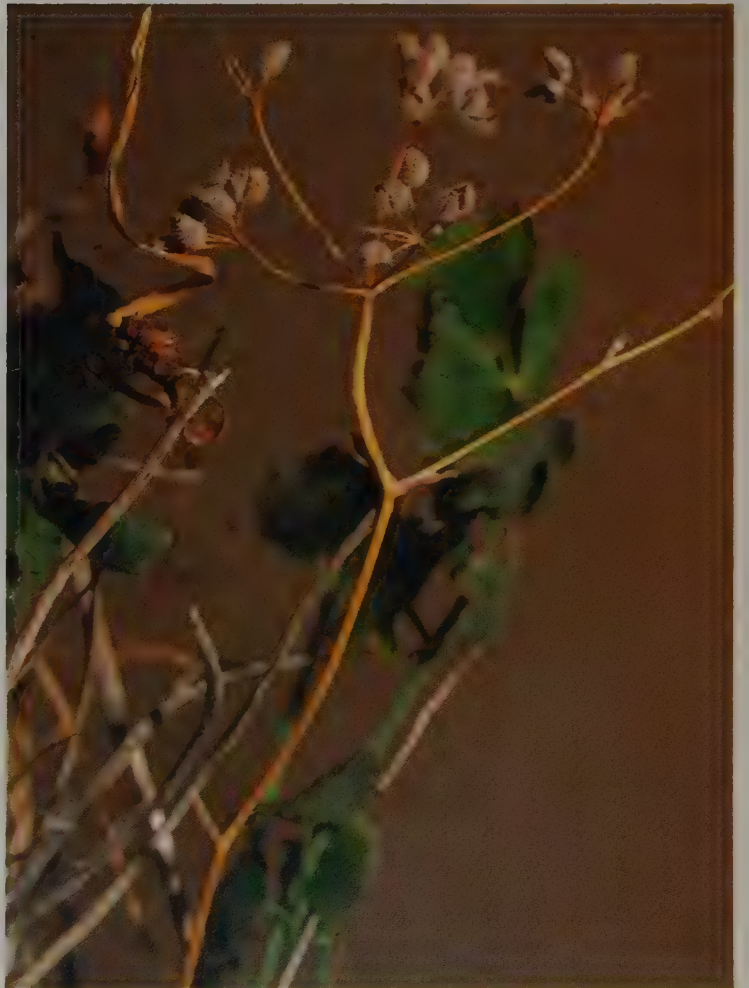
A delicate herb with slender flower stems from a basal rosette of compound leaves with dentate margins; small few-flowered umbels 2 cm wide of white flowers; no scent. The growing shoot is usually nodding. Locally fairly widespread in the Asir and southern Hijaz.

5 km south of Baljurshi, near the head of the Grandi Lavori road; under acacias near the lip of the escarpment. 7,000 ft.

***Pimpinella* sp.** ◆

A dead herb 15 cm tall with compound leaves, the leaflets rounded and with crenulate margins; thick fleshy roots; in fruit, the fruits plump, curved and very hairy.

Jabal Warjan, a granite massif 60 km SW of Madinah; near summit of rocky col. 6,700 ft.





Pituranthos triradiatus ▲

A densely twiggy almost leafless green-stemmed shrublet 60 cm high; umbellules 1 cm wide, composed of six or seven pale yellow flowers 3 mm wide with woolly calyces; no scent. Locally fairly abundant.

Near Zabirah, 200 km north of Buraydah; on the edge of a bauxite outcrop, in drifted sand. 1,800 ft.



***Pycnocycla* sp. (sp. C)** ▲

A many-branched bushy woody herb 50 cm tall with rounded pointed spiny-tipped compound leaves; white flowers in a rounded head 2 cm wide. The flowers and fruits are similar to *P. tomentosa*; only the foliage and habit of growth are different.

North of Shiqri on the road to Tabuk; in crevice of sandstone butte. 3,100 ft.



Pycnocycla glauca ▲

A leafy-based herb with semi-prostrate flower stems 25 cm long; flat heads 2 cm wide of white flowers; no scent. Because the outer flowers have large petals, this plant looks like a scabious.

Tannumah, a watered valley 12 km south of An Nimas; in a rocky crevice among grass. 6,000 ft.



Pycnocycla tomentosa ▲

An erect herb to 1 m tall with a basal rosette of dark green unevenly lobed leaves. The margins occasionally toothed; crowded white flowers in a rounded head 2.5 cm wide; no scent.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; on a steep rocky hillside. 2,500 ft.



Scandix pecten-veneris ♣

An erect delicate herb 7 cm high with deeply dissected leaves; tiny white flowers in umbellules 4 mm wide; no scent. Fairly widespread especially around Jabal Ibrahim.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; in the shade of a large boulder. 5,500 ft.



Torilis arvensis ♣

An erect leafy branching herb 30 cm high with parsley-like leaves; small loose umbellules 1 cm wide of white flowers; non-aromatic. The seeds are covered with purplish hairs.

5 km south of Baljurshi, near the head of the Grandi Lavori road; under acacias near the lip of the escarpment. 7,000 ft.



Torilis nodosa ♣

A tough-stemmed herb with pinnately dissected leaves and ascending stems 40 cm long; white flowers 1 mm wide in small sessile umbels; no scent; oval green fruits with fleshy hooked hairs.

Riyadh; a weed in the lawn of the Agricultural and Water Research Centre. 2,000 ft.



Trachyspermum ammi ▲

A slender erect branching herb 45 cm high with finely dissected leaves; umbels 3 cm wide of white flowers with blackish anthers; no scent. This herb resembles *Ammi majus* but lacks the involucre of fringed bracts beneath the flower heads.

Near Najran; on the edge of cultivation. 4,000 ft.



Zosima absinthifolia ▲

A stout herb 15 cm high with large white-downy leaves; large umbels 7 cm wide of white flowers; no scent. Locally fairly widespread.

Jabal Dabbagh, a 7,500 ft granite massif 88 km SW of Tabuk; on a rocky slope. 5,500 ft.

URTICACEAE

This family, although widely distributed throughout most of the world, is not very well represented in Saudi Arabia. Many people brought up in Europe associate the family only with the nettle and its vicious stinging hairs. *Forskoalea tenacissima*, the most widespread species in Saudi Arabia, closely resembles the European nettle, complete with hairs, but although these hairs are hooked and cling to people, they never sting; the two stinging species both belong to the genus *Urtica*. *Parietaria* is not very nettle-like in appearance and could be mistaken for a member of the Amaranthaceae.

◆ ***Forskoalea tenacissima***

A hairy non-stinging herb 12 cm high, often with red stems; green bud-like flower-clusters. Very widespread everywhere including high altitudes, especially among rocks.

Low rocky hills, 10 km east of Jiddah; among rocks. 80 ft.





Forskoalea viridis ▲

An erect leafy herb 20 cm tall with slightly downy dentate leaves; tiny greenish flowers 1 mm wide cupped in leafy bracts.

At the foot of Jabal Sharda, off the Jiddah-Jizan road; in granite gravel under shade of large boulder. 800 ft.



Parietaria alsinifolia ▲

A soft-leafy herb 10 cm high; bud-like flower-clusters subtended by large green bracts; non-aromatic. Widespread.

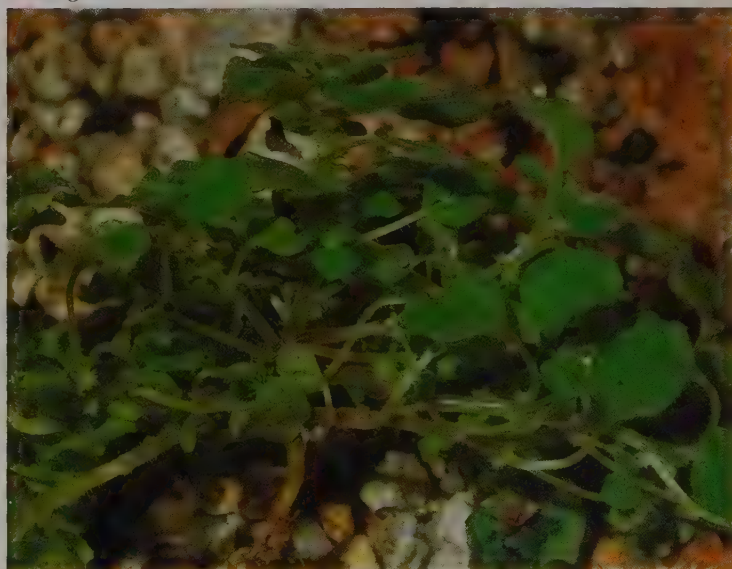
Wadi Kharar, near the foot of the escarpment, Jiddah-Taif road; among rocks. 1,300 ft.



Parietaria debilis ▲

An erect leafy herb 45 cm tall; tiny greenish flowers 1 mm wide among chaffy green bracts.

15 km from Shafa view point, Taif road; in a damp shady crevice among granite boulders near cultivation. 6,800 ft.



***Parietaria lusitanica* forma** ▲

A delicate leafy herb 5 cm tall; tiny greenish bud-like flowers. Similar to *P. alsinifolia*, but the flowers are not subtended by large leafy bracts.

Just below the summit of the escarpment, Taif-Jiddah road; in a shady crevice. 5,900 ft.



Urtica pilulifera ◆

An erect leafy herb 25 cm high covered in stinging hairs; heads of small white flowers on short stalks; spherical hairy fruit; no scent. Grows in clumps.

Near Wadi Wejj, 18 km SW of Taif; in granite gravel, under the shade of an acacia. 5,500 ft.



Urtica urens ◆

An erect herb 40 cm tall with small leaves covered with stinging hairs; green bud-like flowers 2 mm wide; no scent.

Wadi Mahra, 82 km south of Baljurshi, on the Taif-Abha road; in sand under the shade of an acacia. 7,000 ft.

VALERIANACEAE

Four species occur in Saudi Arabia and seem very local in their distribution and, being ephemeral, are easily missed. The author has found *V. muricata* only near Jabal Ibrahim where it is quite abundant in granite sand. The other three were found

in a mixed population near Turayf, and at a casual glance the plants were identical; only the fruits are different. Because of this the line drawing only of the fruit of *V. oxyrrhyncha* is shown; this is winged, wasp-waisted, and has one or two narrow straps.



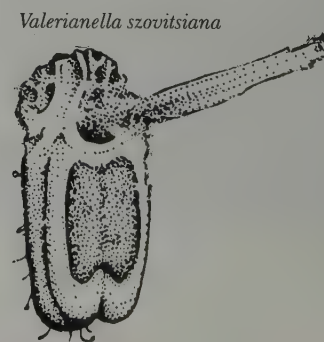
Valerianella oxyrrhyncha



Valerianella muricata



Valerianella dufresnia



Valerianella szovitsiana



Valerianella dufresnia ◆

A very bushy leafy glabrous herb to 11 cm high, the leaves sometimes lobed; pale pinkish lilac flowers 1 mm wide; no scent; fleshy large-winged hairy fruits.

20 km NW of Turayf Camp (31° 40'N, 39° 29'E); in sandy runnel on limestone plateau. 2,900 ft.



◆ ***Valerianella muricata***

An erect slender sparsely branching herb 6 cm tall with opposite leaves; lilac flowers 1 mm wide, in flat heads; no scent; the plant is always weedy and turns a bright lemon-yellow when fruiting.

Jabal Ibrahim, NW of Al Bahah off the Taif-Abha road; in a sand pan under a tree. 8,000 ft.



Valerianella szovitsiana ◆

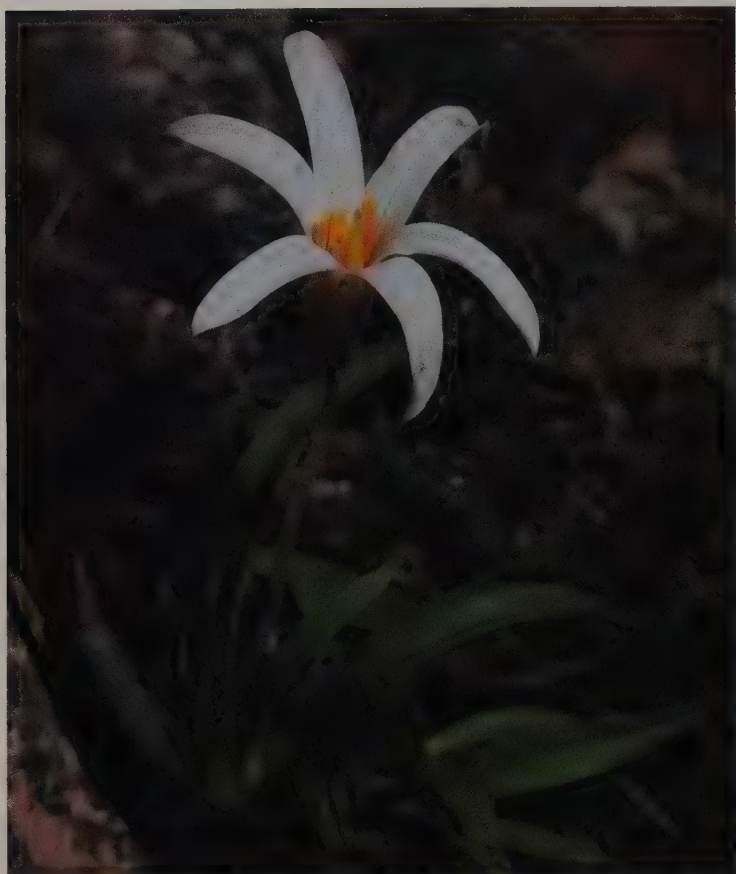
A very bushy leafy glabrous herb to 11 cm high, the leaves sometimes lobed; pale pinkish lilac flowers 1 mm wide; no scent; fleshy fruits with large wings and a lateral strap.

20 km NW of Turayf Camp (31° 40'N, 39° 29'E); in sandy runnel on limestone plateau. 2,900 ft.

VELLOZIACEAE

This family of only four genera has a limited distribution world-wide. So far *Xerophyta arabica* has been seen in only two localities, but it is so grass-like when not in flower that it could

be easily overlooked and may have a wider distribution, though probably limited to the southern Asir. It is fairly widespread in the Yemen.



◆ *Xerophyta arabica* ◆

A leafy grass-like herb with leaves 6 cm long; a single white six-petalled flower 2.5 cm wide on a stem 4 cm long; no scent.

A limestone outcrop between Abha and Najran, 45 km south of Zahran; in rock crevices. 6,200 ft.

VERBENACEAE

This is a fairly large family world-wide and one of its members, *Tectona grandis*, is the source of teak, a valuable durable timber; but none of the species in Saudi Arabia is a tall tree and none is of economic importance. The species vary considerably in

appearance, from the shrubby *Avicennia* and *Lantana* to the herbaceous *Verbena* and *Phyla*; in *Premna* the flowers look close to those of *Misopates* in Scrophulariaceae, though the two families are not related.



◆ *Avicennia marina* ◆

A littoral shrub, very leafy and bushy, 2.5 m high; dark orange waxy flowers 6 mm wide; strong sweet honey-like scent; flat-sided mango-shaped fruits. Fairly widespread in muddy bays. This species grows as a 5 m-tall tree near the freshwater seepage at Bir Ali, where, surprisingly, it also grows a few roots from branches high in the crown of the tree.

Near Umm Sidrah coastguard station, NW of Dhahaban and 75 km north of Jiddah; in a muddy bay. Sea level.





◆ ***Lantana salviifolia***

A bushy leafy shrub 1 m tall with very rugose leaves; white flowers 5 mm wide, in conical heads 1.2 cm long; very aromatic. In scattered localities in the Asir and southern Hijaz.

166 km SE of Jiddah, on the helicopter flight path to Bahah; among shrubs in a small valley. 3,600 ft.



Lantana viburnoides ◆

A bushy leafy shrub 60 cm high, frequently closely grazed; bright lilac and pink flowers in flat heads 2 cm wide; very aromatic. Widespread in the southern mountains but nowhere abundant.

One third of the way up the escarpment, Jiddah-Taif road; on a steep rocky hillside. 3,500 ft.





Phyla nodiflora ◆

A creeping leafy branching herb with stems 8 cm long; tiny pinkish flowers 1 mm wide, in cone-like heads; no scent. Fairly widespread in damp sand in the southern mountains.

Najran; in damp sand near cultivation. 4,500 ft.



Premna resinosa ◆

An erect small-leaved bushy shrub 3 m high; tiny white flowers 3 mm wide; aromatic. Fairly widespread in the Asir and southern Hijaz.

Wadi Kharar, near the foot of the escarpment, Jiddah-Taif road; on a steep rocky hillside. 1,500 ft.

Priva* sp. aff. *cordifolia ◆

An erect sparsely branching herb 25 cm tall with dentate leaves; white flowers 1 cm wide with a deep lilac stripe on the two lower petals; no scent.

Jabal Fayfa, 100 km NE of Jizan; among shrubs on steep rocky hillside. 5,200 ft.



Priva cordifolia* var. *abyssinica ◆

A weak, square-stemmed leafy herb with stems 1 m long; white flowers 7 mm wide, in spikes; no scent.

Wadi al Uss, on the western slope of Jabal Sawdah, NW of Abha, near the Police Post; scrambling through a bush in a wooded ravine. 3,200 ft.





◆ ***Verbena officinalis***

An erect branching leafy herb 60 cm high; tiny pale lilac flowers 2 mm wide, in spikes; non-aromatic. Superficially resembles a *Lavandula*.

Najran, near the New Dam; among rocks, at the edge of the river. 4,600 ft.

VIOLACEAE



Viola stocksii has so far been collected from only two nearby localities, both on the northwest-facing slopes of the southern Hijaz escarpment. The plant is perhaps an annual, as it dies off completely after flowering in the spring.

◆ ***Viola stocksii*** ➤

A leafy herb 12 cm high with glabrous leaves; pale lilac flowers 8 mm wide, the petal tips darker and the lip striped with purple veins; no scent.

One third of the way up the escarpment, Jiddah-Taif road; in a damp sand-pan in a shallow ravine. 3,500 ft.



VITACEAE

This is the family whose species *Vitis vinifera*, with its many cultivars, yields grapes, but although the ripe red fruits of *Cyphostemma* look delicious, they are not believed to be edible except to birds. Two of the three genera and three species are found only in the southern region and mainly in the foothills. They are most easily distinguished, one from the other, by their

foliage, though the squared stem of *Cissus quadrangularis* is unmistakable. The leaves of *Cyphostemma* are palmately compound with very distinct lobes; those of *Cissus quadrangularis* are only slightly lobed; whereas the almost round leaves of *Cissus rotundifolius* are as the name suggests. *Rhoicissus revoillii* is very different and quite unmistakable.



Cissus quadrangularis ◀

A square-stemmed branching vine, frequently leafless; creamy flowers 4 mm wide, in clusters; no scent. Widespread in scattered localities.

Near the foot of the escarpment, off the Jiddah-Taif road, scrambling over bushes 2 m high; on a rocky acacia-covered plain. 1,300 ft.



Cyphostemma digitata ▶

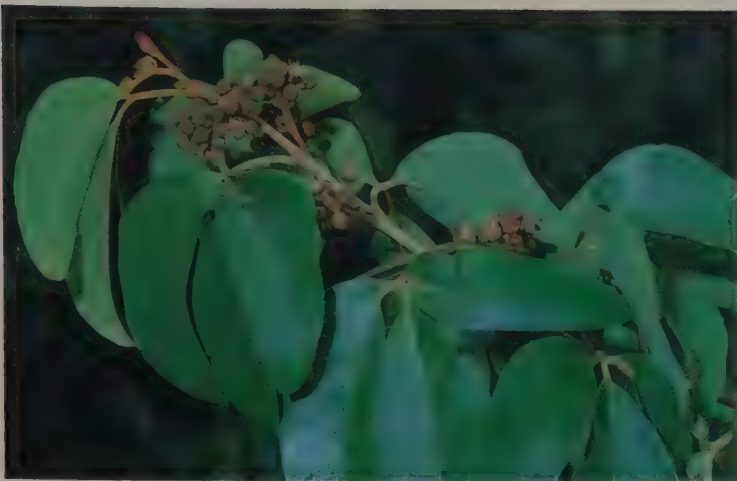
A tangled leafy vine with compound five-part leaves; creamy flowers 3 mm wide, in flat heads; no scent. Widespread in the southern region.

Near Suq al Ahad, 35 km NE of Qunfudhah; scrambling over trees in a wide sandy wadi, among tamarisks. 30 ft.

◆ ***Cissus rotundifolius***

A round-leaved tangled vine; pale greenish flowers 3 mm wide, in flat heads; no scent. Widespread in the southern region.

10 km south of Jabal Abu Hassan, off the escarpment between Abha and Najran, scrambling to 10 m over trees and shrubs, in a rocky ravine. 3,000 ft.



Rhoicissus revoillii ♀♂

A leafy vine with stems several metres long, trifoliate leaves, and long two-forked tendrils; reddish flowers 3 mm wide; no scent.

Jabal Fayfa, 100 km NE of Jizan; climbing over a tree 4 m tall, on a steep hillside. 5,200 ft.



ZANNICHELLIACEAE

This is a small family of only four genera, but it is distributed widely throughout the world in fresh and brackish water. The species are all aquatic plants having small inconspicuous

unisexual flowers; in *Zannichellia palustris* the male and female flowers are on the same plant. Because the plants are very slender and submerged, they are easily overlooked.



◆ ***Zannichellia palustris* var. *genuina*** ◆

A slender-stemmed aquatic herb with stems 20 cm long and with very narrow pale green leaves; fruits with very short pedicel and style.

Near Jabal Ibrahim, off the Taif-Abha road; submerged in a small deep pool in a shallow ravine near cultivation. 6,500 ft.

ZYGOPHYLLACEAE

Most of the species in Saudi Arabia are herbs, sometimes woody-based, with *Balanites* the only tree and *Nitraria* and *Tribulus arabicus* shrubby; each genus bears little resemblance to the other. *Zygophyllum* is mainly succulent and apart from the flowers closely resembles the succulent *Chenopodiaceae*, among which it often grows, *Z. album* and *Z. coccinea* particularly so. *Fagonia* are bushy prickly herbs except for *F. glutinosa*, which is usually prostrate. *Tribulus* is also mainly prostrate, as is *Seetzenia lanata*, which having trifoliate leaves can almost be mistaken for a member of the *Leguminosae* until one sees the fruit, a spherical capsule. *Peganum* is again very different from the other genera and has seeds that yield the dye

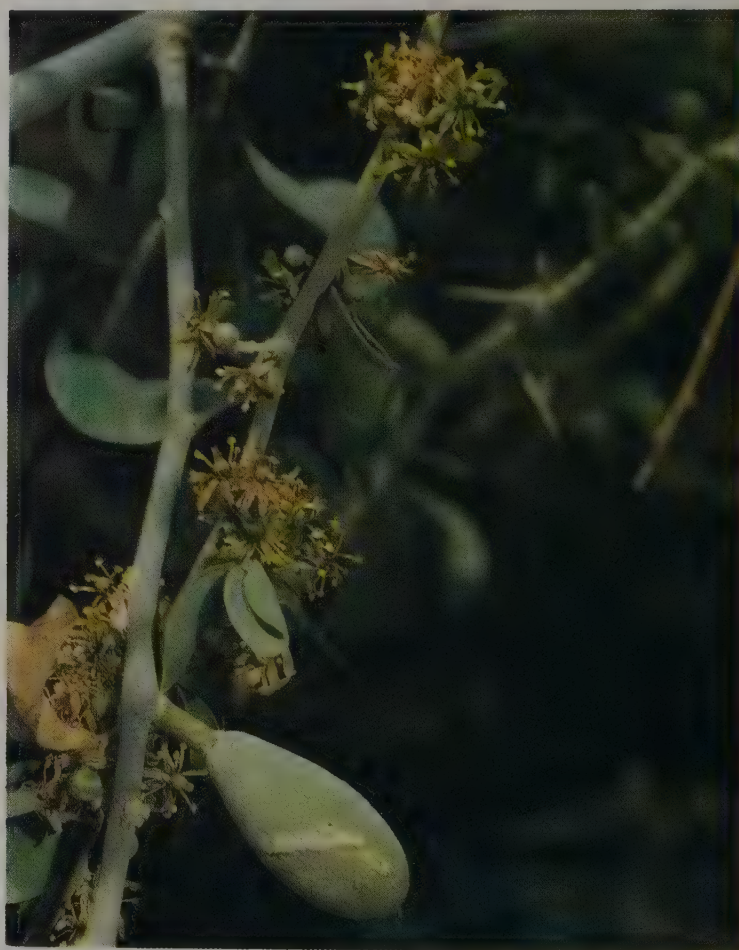
turkey red, though it does not seem to be used for that purpose in Saudi Arabia. *Tribulus* species are easiest to identify by studying the fruits because the flowers and foliage of the species are remarkably similar; this is also a genus in which habitat plays an important part in determining size, both of plant and flowers; two identical species, growing less than 1 metre apart, can have flowers on one plant only 5 mm wide and those on another plant nearly 2 cm wide, with the length of their stems in proportion; the larger plant might have the benefit of a trickle of water, perhaps from a well; plants growing in arid conditions are also much hairier having leaves and stems of silvery appearance.



Balanites aegyptiaca ◆◆

A large crowned tree 8 m tall with finely fissured bark and greyish green twin leaflets, a few of the branches carrying long spines; greenish-yellow flowers 1.2 cm wide; spicy scent; oval pear-shaped fruits.

30 km south of Khamis al Bahr, Muhayl-Jizan road; among Dom palms in a shallow wadi among low rocky hills. 500 ft.



◆ ***Fagonia bruguieri***

An arching-stemmed spiny herb 10 cm high and 18 cm wide; lilac flowers 1.3 cm wide; faint scent. Very widespread, especially in the north, and somewhat variable.

Near Zabirah, 200 km north of Buraydah; at the edge of a bauxite outcrop. 1,800 ft.



Fagonia indica ◆

A bushy spiny herb 15 cm high; lilac flowers 1.5 cm wide with large curved sepals; no scent. Fairly widespread in the south.

Near Suq al Ithnayn, 58 km south of Abha; in crevice of sandstone plateau. 7,900 ft.

***Fagonia glutinosa*** ◆

A branching prostrate herb with stems 12 cm long; deep rosy-lilac flowers 8 mm wide; no scent; the stems and fruits are slightly sticky. Widespread in the north.

Near Nabhaniyah, 100 km SW of Buraydah; half buried in hard sand. 2,300 ft.

***Fagonia paulayana*** ◆

A branching spiny stemmy herb 30 cm high with widely spaced spines and flowers; lilac flowers 8 mm wide; no scent.

Low rocky hills, 10 km east of Jiddah; in hard sand. 80 ft.

Fagonia schweinfurthia ◆

An erect slender-stemmed bushy herb 30 cm tall with a few narrow leaves; lilac flowers 1 cm wide.

60 km NNE of Al Arid Camp (19° 10'N, 45° 06'E); in shallow gully behind limestone escarpment and on edge of Rub' al Khali. 3,200 ft.



◆ ***Fagonia tenuifolia***

A bushy leafy spineless herb 15 cm high with aromatic foliage; deep rosy-lilac flowers 1.3 cm wide.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; on a steep rocky hillside. 3,000 ft.



◆ ***Nitraria retusa***

A low spreading shrub 60 cm wide with leathery bluish leaves; greenish yellow flowers 6 mm wide; sweet scent; cylindrical succulent red fruits.

Ash Sharmah, near the Gulf of Aqaba; on the sandy shore. 1 ft.



◆ ***Setzenia lanata***

A prostrate leafy herb with branching stems 20 cm long and glaucous trifoliate leaves; pale greenish flowers 6 mm wide; no scent. Fairly widespread in scattered localities in the north.

Near Nabhaniyah, 100 km SW of Buraydah; in hard gravelly sand. 2,300 ft.



***Fagonia tristis* var. *boveana* ◆**

A very leafy bushy herb 20 cm high, the hairy leaves tipped with spines; pale lilac-pink flowers 1.5 cm wide; aromatic. Locally fairly widespread; the depth of colour is variable.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; in a gravelly wadi. 2,000 ft.

***Peganum harmala* ◆**

A bushy leafy herb 30 cm high; white flowers 2 cm wide; strong sour smell. Widespread and seldom grazed.

Hamdah, 125 km NE of Khamis Mushayt; in a sandy wadi. 3,500 ft.





Tribulus arabicus ◆◆

A stout-stemmed shrub 65 cm tall and 1 m wide with very soft silvery leaves; yellow flowers 2.5 cm wide; very hairy winged fruits. Locally abundant, but only among the dunes.

Rub' al Khali, 60 km NNE of Dawadimi Camp (19° 10' N, 45° 06' E); on the lower slopes of big red sand dunes. 3,200 ft.



Tribulus bimucronatus ◆

A prostrate branching leafy herb with stems to 30 cm long; pale yellow flowers 7 mm wide; furry fruits. Locally abundant especially along the hard shoulder of roads.

Alongside the new Jiddah Airport, Jiddah-Madinah road; in a wide sandy ditch. 30 ft.





Tribulus kaiseri ◆

A prostrate branching leafy herb with stems to 25 cm long; yellow flowers 1 cm wide; smooth five-segmented fruits.

Jabal Qutn, 15 km NE of Uqlat as Suqur, off the Madinah-Qassim road; in hard sand near a granite outcrop. 3,000 ft.



Tribulus macropterus ◆

A prostrate leafy hairy herb with stems to 1 m long; yellow flowers 1.5 cm wide; hairy fruits with winged angles and soft spines.

Ash Sha'ib, 25 km ENE of Hamdah; in damp sand near camp drains. 3,800 ft.



Tribulus parvispinus ◆

Prostrate downy-leaved herb with stems 7 cm long; yellow flowers 6 mm wide; soft long-hairy spherical fruits.

Jabal Manfah, 50 km NNW of Najran on the Abha road; among sandstone rocks. 6,200 ft.



Tribulus pentandrus ◆

A prostrate slightly hairy leafy herb with stems 20 cm long; yellow flowers 1 cm wide; very hairy five-ridged fruits.

Wadi Sawawin iron-ore deposit, 75 km SW of Tabuk; in hard sand. 2,000 ft.



Tribulus terrestris* var. *terrestris ◆

A leafy prostrate branching herb with stems to 30 cm long; yellow flowers 1.5 cm wide; ridged hairy fruits with small narrow spines.

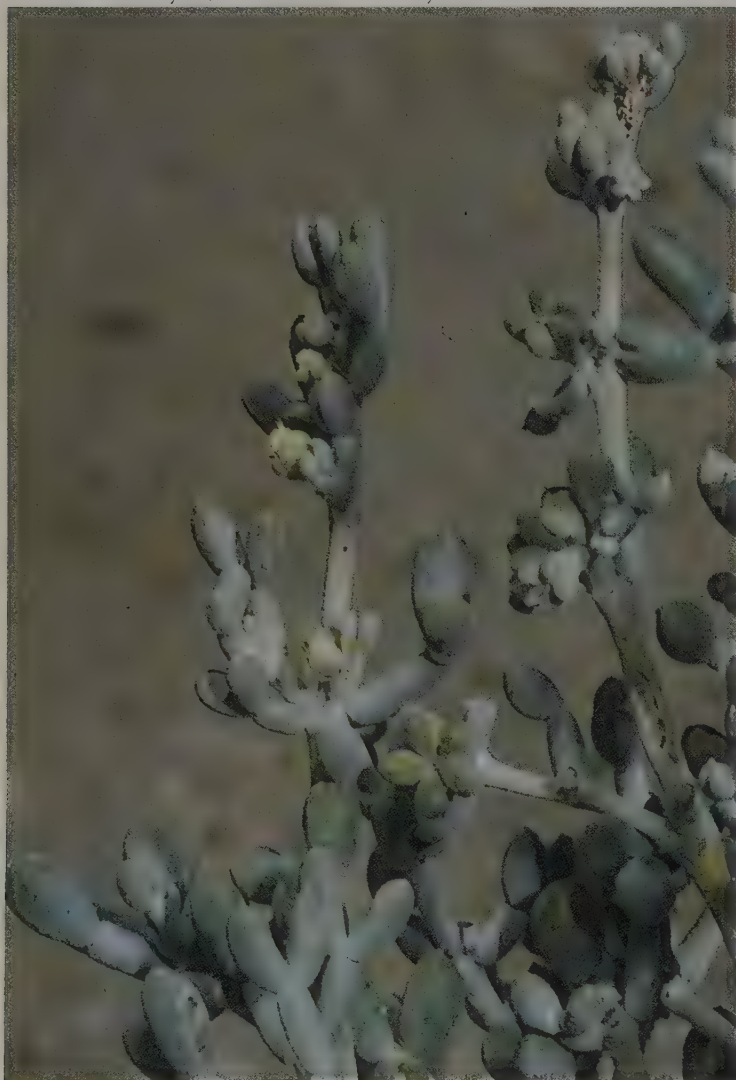
Near Nabaniyah, 100 km SW of Buraydah; in hard sand. 2,300 ft.



Tribulus terrestris* var. *robustus ◆

A leafy prostrate branching herb with stems 40 cm long; in fruit, large coarse-spiny fruits 2 cm wide.

Near Zabirah, 200 km north of Buraydah; in hard sand. 1,800 ft.



Zygodphyllum album ◆

An erect bushy succulent herb with mealy oval succulent leaflets; greenish white flowers 6 mm wide; no scent; erect sessile fleshy star-like fruits 7 mm long. Very widespread in saline soil.

Umm Sidrah, coastguard station NW of Dahaban, 75 km north of Jiddah; in sand, just above high tide mark. Sea level.



Zygodphyllum coccineum ◆

A bushy succulent-leaved herb 30 cm high; not wide-opening yellow flowers 4 mm wide; no scent; erect smooth cylindrical fruits 1 cm long on pedicels 7 mm long. Locally abundant.

Jabal Tayran, overlooking the Gulf of Aqaba; in red sand. 1,800 ft.

Zygophyllum decumbens ♦

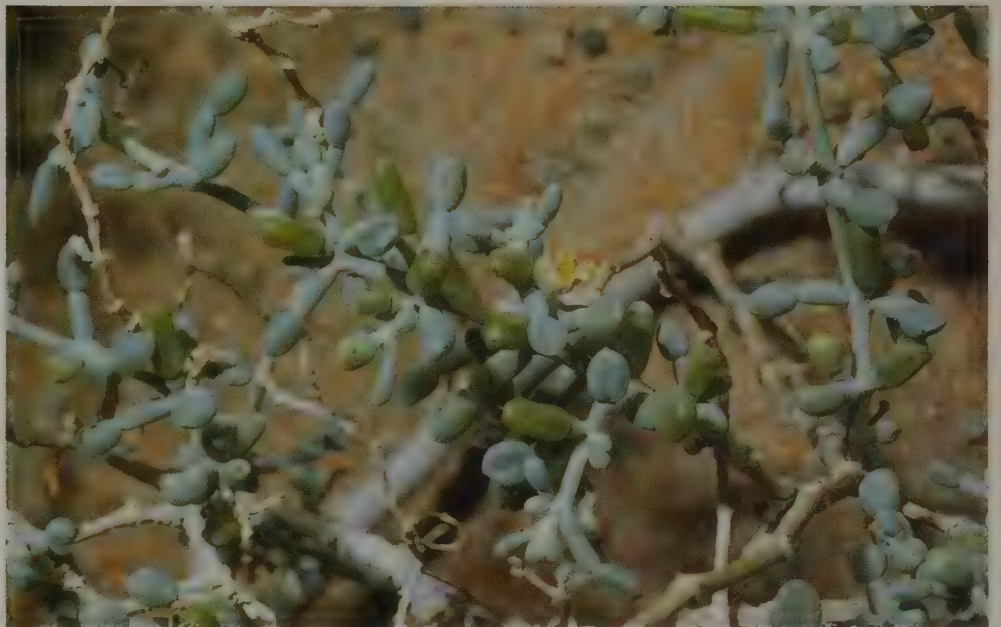
A woody-based succulent shrublet with mealy young stems and twin spatulate leaves having a distinct petiole; creamy flowers 5 mm wide; no scent; pendent five-ridged drop-shaped fruits.

Sea shore, between Duba and Ash Sharmah; in hard sand. 10 ft.

***Zygophyllum hamiense*** ♦

A spreading bushy shrublet 75 cm high and 1 m wide with very mealy grey succulent leaves; not wide-opening creamy green flowers 5 mm wide; ridged green cylindrical fruits 8 mm long.

Edge of Rub' al Khali, 100 km south of Al Arid Camp (19° 10'N, 45° 06'E); in hard saline sand at base of dunes. 3,000 ft.

***Zygophyllum simplex*** ♦

A delicate-stemmed semi-prostrate succulent-leaved herb 5 cm high and 12 cm across; bright yellow flowers 6 mm wide; no scent. A very widespread plant in hard sand.

Between new Jiddah Airport and Madinah road, Jiddah; in a wide sandy ditch. 20 ft.



MAIN COLLECTION AREAS

Aban al Ahmar	25° 30' N 42° 48' E	Jabal Shumruk	20° 22' N 41° 19' E
Abha	18° 13' N 42° 30' E	Jabal Tamiyah	25° 36' N 41° 59' E
Abu Arish	16° 58' N 42° 50' E	Jabal Tayran	28° 30' N 34° 56' E
Ad Darb	17° 44' N 42° 15' E	Jabal Warjan	23° 58' N 39° 15' E
Ain Markub	20° 33' N 40° 09' E	Jiddah	21° 29' N 39° 12' E
Al Aqiq	20° 16' N 41° 40' E	Jizan	16° 54' N 42° 32' E
Al Aridah	17° 03' N 43° 05' E	Jumum	21° 33' N 39° 40' E
Al Bahah	20° 01' N 41° 28' E	Khamis Mushayt	18° 18' N 42° 44' E
Al Hadda	21° 23' N 40° 14' E	Madinah	25° 00' N 39° 00' E
Al Jawf	30° 00' N 39° 00' E	Makkah	21° 27' N 39° 49' E
Al Jumum	21° 37' N 39° 42' E	Mikhwa	19° 45' N 41° 24' E
Al Lith	20° 09' N 40° 16' E	Mudhaylif	19° 32' N 41° 03' E
Al Moraiwa	18° 53' N 41° 58' E	Muhayl	18° 32' N 42° 03' E
Al Qassim (Airport)	26° 10' N 44° 00' E	Nabhaniyah	25° 51' N 43° 03' E
Al Qunfudhah	19° 08' N 41° 05' E	Najran	17° 30' N 44° 10' E
Al Quz junction (Quz)	18° 58' N 41° 18' E	Nuqrah	25° 34' N 41° 24' E
Al Wahbah (Crater)	22° 54' N 41° 15' E	Qiba	27° 24' N 44° 20' E
An Nimas	19° 07' N 42° 08' E	Radwan	22° 03' N 41° 09' E
Ash Sha'ib	19° 13' N 43° 38' E	Ra's Baridi	24° 17' N 37° 31' E
Ash Sharmah	28° 01' N 35° 16' E	Riyadh	24° 40' N 46° 45' E
At Taif	21° 16' N 40° 25' E	Riyadh al Khabra	26° 02' N 43° 33' E
Az Zabirah	28° 02' N 43° 45' E	Sabiya	19° 22' N 41° 07' E
Baid al Jimalah	25° 09' N 42° 41' E	Sawawin (Jabal as Sinfa)	27° 57' N 35° 47' E
Baljurshi	19° 51' N 41° 33' E	Sayl al Kabir	21° 38' N 40° 25' E
Bani Malek	17° 21' N 43° 08' E	Shiqri	28° 08' N 35° 54' E
Bani Rizam	18° 20' N 42° 28' E	Sudd Samallaqi (Dam)	21° 07' N 40° 30' E
Bir al Hamdah (Jabal Tayran)	28° 30' N 34° 56' E	Suq al Ahad	19° 11' N 41° 12' E
Buraydah	26° 20' N 43° 59' E	Suq Ayban	17° 17' N 43° 03' E
Dawmat al Jandel (Al Jawf)	29° 48' N 39° 50' E	Suq al Ithnayn	18° 02' N 42° 45' E
Dhahaban	21° 56' N 39° 08' E	Tabuk	28° 23' N 36° 35' E
Farasan Islands	between 16° 38' N 42° 10' E	Talhah	17° 46' N 43° 31' E
	and 16° 55' N 41° 45' E	Tannumah	19° 00' N 42° 09' E
Grandi Lavori Road (Wadi Dhiyan)	between 19° 51' N 41° 09' E	Thaniyat Camp	29° 46' N 37° 58' E
	and 19° 34' N 41° 39' E	Turayf Camp	31° 40' N 39° 29' E
Gulf of Aqaba	29° 00' N 34° 40' E	Turayf Camp Three	30° 51' N 38° 56' E
Hail	27° 35' N 41° 40' E	Umm Sidrah coastguard station	21° 57' N 39° 26' E
Hamdah	19° 02' N 43° 36' E	Uqlat as Suqur	25° 50' N 42° 12' E
Hanakiyah	24° 51' N 40° 31' E	Wadi Ash Shiqri	28° 02' N 35° 54' E
Harrat Khaybar Camp	25° 41' N 39° 57' E	Wadi Badanah	30° 59' N 41° 02' E
Jabal Abu Hassan	17° 42' N 42° 54' E	Wadi Dhiyan (Grandi Lavori Road)	between 19° 51' N 41° 09' E
Jabal Al Umayd (Wadi Singh)	21° 13' N 40° 18' E		and 19° 34' N 41° 39' E
Jabal Anagayn	23° 14' N 39° 38' E	Wadi Fatimah	21° 20' N 39° 20' E
Jabal An Nabah	18° 42' N 41° 49' E	Wadi Habaqah	19° 48' N 41° 49' E
Jabal Ash Shati Range	28° 10' N 35° 32' E	Wadi Halahila	17° 41' N 43° 57' E
Jabal Awf	23° 59' N 39° 16' E	Wadi Hali	18° 36' N 41° 18' E
Jabal Az Zudh	28° 20' N 35° 18' E	Wadi Kharar	21° 17' N 40° 06' E
Jabal Dabbagh	27° 52' N 35° 45' E	Wadi Khulays	22° 09' N 39° 19' E
Jabal Fayfa	17° 14' N 43° 05' E	Wadi Liyyah	21° 12' N 40° 30' E
Jabal Harb	27° 58' N 35° 41' E	Wadi Mahra	19° 25' N 41° 58' E
Jabal Ibrahim	20° 27' N 41° 09' E	Wadi Maraba	17° 54' N 42° 23' E
Jabal Manfah	17° 33' N 44° 09' E	Wadi Qaraqir (headwaters)	27° 44' N 36° 25' E
Jabal Mershid	19° 04' N 41° 19' E	Wadi Sabha	28° 04' N 43° 30' E
Jabal Qutn	26° 00' N 42° 20' E	Wadi Turabah	21° 34' N 41° 52' E
Jabal Radwa	24° 34' N 38° 18' E	Wadi al Uss	18° 15' N 42° 15' E
Jabal Sawdah	18° 18' N 42° 20' E	Wadi Wejj (Jabal Barad)	21° 08' N 40° 13' E
Jabal Sayid Camp	23° 49' N 40° 57' E	Yanbu al Bahr	24° 05' N 38° 03' E
Jabal Shar	27° 39' N 35° 45' E	Zahrn	17° 40' N 43° 30' E
Jabal Sharda	19° 42' N 41° 22' E	Zaymah	21° 37' N 40° 06' E

INDEX OF PLANT NAMES

Entries with an asterisk are species new to science or new to Saudi Arabia.
Specimen numbers are given within brackets.

- Aaronsohnia factorovskii Warb. & Eig (31, 51, 410, 870, 2426) 135
Abrus bittae Deff. (1953, 3166) 285
Abutilon bidentatum Hochst. ex A. Rich. (669, 1488) 357
*Abutilon sp. aff. bidentatum Hochst. ex A. Rich. 1149 (1149) 358
*Abutilon sp. aff. bidentatum Hochst. ex A. Rich. 1471 (1471) 358
*Abutilon sp. aff. bidentatum Hochst. ex A. Rich. 1486 (1486) 359
Abutilon figarianum Webb (686, 4830) 358
Abutilon fruticosum Guill. & Perr. (240, 268, 421, 809, 1461) 359
Abutilon muticum (Del.) Webb (1062) 359
Acacia abyssinica Hochst. ex Benth. var. macroloba Schweinf. (236, 1778, 2608, 2609, 2610, 2637) 285
Acacia albidula Del. (4640) 286
Acacia asak (Forssk.) Willd. (1239, 1505) 286
Acacia ehrenbergiana Havne (739, 1585) 287
Acacia elatior Brenan sp. elatior (2701) 287
Acacia etbaica Schweinf. (73, 101/74, 2810, 2943) 287
Acacia etbaica Schweinf. ssp. uncinata Brenan (2663, 2902, 2943, 3389) 288
Acacia iraqensis Rech. f. (1484, 1808, 2851, 2938) 288
Acacia hamulosa Benth. (120/72, 547, 1752) 289
Acacia laeta R. Br. ex Benth. (201) 289
Acacia mellifera (Vahl) Benth. (2015) 289
Acacia negrii Pichi-Sermolli (2805, 2806) 289
Acacia nubica Benth. (1422, 1963) 290
Acacia seyal Del. (3537) 290
Acacia tortilis (Forssk.) Hayne (1157, 1948, 2399) 291
Acacia tortilis (Forssk.) Hayne ssp. raddiana (Savi) Brenan (58, 4303) 291
Acalypha fruticosa Forssk. (653, 1533) 234
Acalypha indica L. (1587) 234
*Acalypha racemosa Baill. (3574) 234
Acanthaceae 26
Acantholepis orientalis Boiss. (4269) 135
Achillea Biebersteinii Afan. (38, 351, 1314, 4453) 136
Achillea fragrantissima (Forssk.) Sch. Bip. (2567) 136
Achyranthes aspera L. (595, 1709) 40
Achyranthes aspera L. var. sicula L. (1194, 1768) 41
Acokanthera schimperi (A. DC.) Benth. (1294, 2103) 50
Actinopterys semiflabellata Pic.-Ser. (1775, 1596) 406
Adenia venenata Forssk. (1241) 392
Adenium obesum (Forssk.) Roem. & Schult. (1681, 1986) 50
Adiantum capillus-veneris L. (1394, 1770) 406
Adiantum incisum Forssk. (3274) 407
*Adonis dentata Del. (4263) 415
Aellenia subaphylla (C.A. Mey.) Aellen (2831) 115
Aerva javanica (Burm. f.) Juss. ex J. A. Schultes (714, 804, 1493, 1560, 1582) 41
Aerva lanata (L.) Juss. ex J. A. Schultes (1139, 1478) 41
Agavaceae 34
Ageratum conyzoides L. (2012) 136
Aizoaceae 36
Aizoon canariense L. (141/72, 255/74, 1021) 36
Aizoon hispanicum L. (2535) 36
Ajuga arabica P. Davis (4296) 266
Ajuga bracteosa Wall. (354, 1259, 2046) 266
*Ajuga chamaepitys (L.) Schreb. ssp. tridactylites (Benth.) P. Davis (4394) 267
Albucca abyssinica Dryand. (394, 1607, 2649) 336
Alichemilla cryptantha Steud. (2674) 424
Alectra parasitica Hochst. ex A. Rich. (2611) 442
Alhagi maurorum Medic. (3305) 291
Alkanna orientalis (L.) Boiss. (867, 1180, 2047) 76
Allium sp. aff. ampeloprasum L. (390, 1254, 2632, 3507) 336
Allium pseudocalyptratum Mouterde (1361) 337
*Allium sp. aff. rothii Zucc. (3423) 337
Allium sinaiticum Boiss. (975) 337
Allium sindjarense (Boiss.) Boiss. & Hausskn. ex Regel (975B, 2513) 337
Allium stamineum Boiss. (518, 2435) 338
*Allium sp. 2504 (2504) 338
*Aloe castellorum J.R.I. Wood (3167) 339
*Aloe fleurentinorum Lavr. (1297) 339
*Aloe sp. aff. niebuhriana Lavr. (2697) 339
Aloe rubroviolacea Schweinf. (2054, 2682) 340
Aloe sabaea Schweinf. (1993) 340
*Aloe sp. aff. scobinifolia G. Reyn. & Bally (4981) 341
*Aloe sheilae Lavr. (3397) 341
*Aloe sp. aff. tomentosa Deff. (1285, 1653, 1684, 2218) 342
Aloe vacillans Forssk. (2626, 2724, 2936, 2939) 342
*Aloe sp. nov. aff. vacillans Forssk. (2647, 2842, 3506) 343
Aloe vera (L.) Burm. f. var. officinalis Forssk. (1975) 343
*Aloe sp. nov. (Radwa) 2219 (2219B, 2900, 2916, 3134, 4409, 4967) 344
*Aloe sp. (sp. C. of J.R.I. Wood) 3535 (3525) 344
*Aloe sp. (Shafa) 3738 (3134, 3738, 3779) 345
*Aloe sp. 4329 (4329) 345
Allophylus rubifolius (Hochst.) Engler (3697) 439
*Alternanthera pungens Kunth (2685) 41
Alternanthera sessilis (L.) R. Br. (4655) 42
Althaea ludwigii L. (91, 2452, 2769) 360
Alyssum desertorum Stapf (3974) 192
Alyssum homalocarpum (Fisch. & Mey) Boiss. (965) 192
Alyssum linifolium Steph. & Willd. (4264) 192
Amaranthaceae 40
Amaranthus graecizans L. (812, 1046, 1736) 42
Amaranthus hybridus L. (1378) 42
Amaranthus spinosus L. (2010) 42
Amaryllidaceae 44
Ambrosia maritima L. (2651) 136
Ammannia auriculata Willd. (2212) 356
Ammannia baccifera L. (1691) 356
Ammi majus L. (1402, 2571) 481
Amygdalus arabica Oliv. (3437) 425
Anabasis cf. ehrenbergii Schweinf. (1520) 115
Anabasis setifera Moq. (800, 1418) 115
Anacardiaceae 47
Anagallis arvensis L. ssp. arvensis (1632) 413
Anagallis arvensis L. ssp. foemina (Mill.) Schinz & Thell. (488, 947, 1553) 413
*Anagallis sp. nov. (30/75, 1299, 2040) 414
Anagyris foetida L. (1345, 2125) 291
Anarrhinum orientale Benth. (280, 597, 1250) 442
Anastasia hierochuntica L. (211/74, 1034, 1858) 192
Anchusa aegyptiaca (L.) DC. (3376) 76
*Anchusa affinis R. Br. ex DC. (1399, 2130) 76
Anchusa milleri Willd. (482, 485, 862) 77
Andrachne aspera Spreng. (839, 1700) 235
Andrachne aspera Spreng. var. glandulosa Hochst. ex A. Rich. (1731) 235
Andrachne telephoides L. (3762, 4108) 235
*Androsace maxima L. (4260) 414
Anisodiadum lanatum Boiss. (88, 99, 436, 1820, 2415) 481
Anisotes trisulcus (Forssk.) Vahl (338, 1218) 26
*Annona squamosa L. (3572) 49
Annonaceae 49
Anogramma leptophylla (L.) Link (3236) 407
Anthemis deserti Boiss. (980, 1879, 2493) 137
Anthemis pseudocotula Boiss. (1281) 137
*Anthemis sp. 3562 (3562) 137
Anticharis arabica Endl. (802) 443
Anticharis glandulosa Asch. (4306, 4726) 443
Anticharis linearis (Benth.) Asch. (4284) 443
Anvillea garcinii (Burm.) DC. (92, 111, 544, 1796, 2554) 138
Apium graveolens (L.) Lag. (4566, 4906) 481
Apium nodiflorum (L.) Lag. (1358) 482
Apocynaceae 50
Aptosimum pumilum (Hochst.) Benth. (1445, 1495) 443
Arabidopsis kneuckeri (Bornm.) O.E. Schulz (1258, 2059) 193
Arabidopsis thaliana (L.) Heyn (1911) 193
Arabis alpina L. (1256, 2051) 193
*Arabis sp. (967) 194
Araceae 52
Arenaria leptoclados (Reichenb.) Guss. (forma) (1286, 1376) 100
Arenaria ? serpyllifolia L. (1590, 3243) 101
Argemone mexicana L. (2698) 388
Argemone ochroleuca Sweet (1556) 389
Argyrobolium arabicum (Decne.) Jaub. & Spach (6, 155, 210, 376, 1101, 2187, 2662) 292
*Argyrobolium sp. aff. arabicum (Decne.) Jaub. & Spach (1705) 292
Argyrobolium confertum Polhill (359, 3314) 292
*Argyrobolium sp. aff. crotalarioides Jaub. & Spach (4381, 4795) 292
Aristolochia bracteolata Lam. (1604) 52
Aristolochiaceae 52
Arnebia decumbens (Vent.) Coss. & Kral (976, 997, 2412) 77
Arnebia hispidissima (Lehm.) DC. (1061, 1848) 77
Arnebia tetragyna Forssk. (4279) 77
Artemisia abyssinica Sch. Bip. (1371) 138
Artemisia judaica L. (3443) 138
Artemisia monosperma Del. (2508) 139
Artemisia scoparia Waldst. & Kit. (4500) 139
Artemisia sieberi Besser (2515, 4352) 139
Arthrocnemum glaucum (Del.) Ung.-Sternb. (1519, 2790) 116
Arthrocnemum macrostachyum (Moris.) Moris & Delpont (4839) 116
Asclepiadaceae 53
Asclepias africanus Lam. (1201) 346
Asparagus aphyllus L. var. stipularis (Forssk.) Bak. (392, 507) 346
Asparagus falcatus L. (1293) 346
Asparagus flagellaris (Kunth.) Bak. (548, 1509, 4841) 346
*Asperugo procumbens L. (3482) 78
Asphodelus sp. aff. aestivus Brot. (1079, 1722) 347
Asphodelus fistulosus L. (54, 805, 1739, 2514) 347
Asphodelus refractus Boiss. (2511) 348
Asplenium aethiopicum (Burm.) Bech. (2048) 407
Asplenium trichomanes L. (2673, 3315) 407
Aster squamatus (Spr.) Hieron (4462) 139
Asteriscus graveolens Less. (928) 140
Asteriscus pygmaeus (DC.) Coss. & Dur. (68, 2425) 140
Astragalus abyssinicus Steud. (362, 1099, 2144) 293
Astragalus annularis Forssk. (2533) 293
Astragalus atropilosus (Hochst.) Bunge (3902) 293
Astragalus bombycinus Benth. (994, 1854) 293
Astragalus caprinus L. var. laniger (Desf.) Maire (978A, 4810) 294
Astragalus corrugatus Bert. (215, 4078) 294
Astragalus eremophilus Boiss. (1825, 2408, 3224, 3505, 4038) 294
Astragalus fatimensis Hochst. ex Chiov. (318, 1050, 1124) 294
Astragalus hauarensis Benth. (2568) 295
Astragalus kahiricus DC. (1870) 295
Astragalus palaestinus Eig (2483, 3420) 296
Astragalus schimperi Boiss. (922, 1822, 2534, 3449, 4244) 296
Astragalus sieberi DC. (86, 1111, 1661, 1793, 2079) 296
Astragalus sparsus Decne. (386, 475, 841, 2092, 4760) 297
Astragalus spinosus (Forssk.) Muschl. (41, 981, 103A) 297
Astragalus traconiticus Post (3419, 4215) 298
Astragalus tribuloides Del. sensu lato (1822, 4276) 298
Astragalus tribuloides Del. var. minutus (Boiss.) Boiss. (920, 2480, 3363, 3391) 298
Astragalus sp. aff. tribuloides Del. (1878, 2541) 299
Astragalus sp. aff. tribuloides Del. var. tribuloides (866) 299
Astragalus vogelii (Webb) Bornm. (1522) 299
*Astragalus sp. (section Rhacophorus) (4773, 5317) 300
Astragalus sp. 1000 (1000) 300
Astragalus sp. 1811 (1811) 300
Astragalus sp. 1826 (1826) 300
Astragalus sp. 2408 (2408, 3516, 4298) 300
Astragalus sp. 3426 (3426) 301
*Astripomoea malvacea (Klotzsch) Meuse (3275) 180
Asystasia gangetica (L.) T. Anders (2008) 26
Attractylis arabica Rech. f. (2562) 140
Attractylis cancellata L. (1413B, 2438) 140
Attractylis carduus (Forssk.) Christ. (103, 1457, 1821, 1844, 2561) 141
Atraphaxis spinosa L. (467, 964) 401
Atriplex dimorphostegia Kar. & Kir. (915, 1873, 2560) 116
Atriplex farinosa Forssk. (1060) 117
Atriplex leucoclada Boiss. (1880) 117
Avicennia marina (Forssk.) Vierh. (129/72, 1517) 494
Bacopa monnieri (L.) Pennell (1207, 1641) 444
Balantites aegyptiaca Del. (4822) 500
Ballota undulata (Fres.) Benth. (4342) 267
*Ballota sp. nov. (2888, 3759, 3803) 267
Barbeyaceae 75
Barbeya oleoides Schweinf. (1404, 2158A, 2158B) 75
Barleria acanthoides Vahl (1417) 27
Barleria bispinosa (Forssk.) Vahl (335, 591, 2031) 27
Barleria hochstetteri Nees (629, 1023, 1481, 1957, 4713, 4750) 27
*Barleria sp. aff. hochstetteri Nees (1426, 1469, 1474) 28
Barleria parviflora R. Br. (1476, 2666) 28
*Barleria sp. aff. parviflora R. Br. (3381) 28
Barleria proxima Lindau (1451) 28
Barleria trispinosa (Forssk.) Vahl (232, 586) 29
Bassia eriophora (Schrad.) Kuntze (916, 2417) 117
Bassia muricata (L.) Asch. (990, 2478) 117
Becium filamentosum (Forssk.) Chiov. (267, 1227) 267
Becium serpyllifolium (Forssk.) J.R.I. Wood ined. (2999, 3161, 3296) 268
Bellevallia flexuosa Boiss. (3422) 348
Berchemia discolor (Klotzsch) Hemsl. (3163) 421
*Bergeria polyantha Sond. (3237, 4290) 229
*Bergia suffruticosa (Del.) Fenzl (4982) 229
Beta vulgaris L. (2558) 118
Bidens biternata (Lour.) Merr. (1698) 141
Bienertia cycloptera Bunge (2454) 118
Bifora testiculata (L.) Roth. (4922) 482
Biscutella didyma L. (837, 853, 1745, 2179) 194

- Biserrula pelecinus* L. (3480) 301
Blepharis ciliaris (L.) B. L. Burt (217/74, 1512, 2014) 29
 **Blepharis maderaspatensis* (L.) Roth (4672) 29
 **Blumea aurita* DC. (4282) 141
Blumea bovei (DC.) Vatke (926, 1067, 2775) 141
Blumea gariepina DC. (1616) 162
Blyttia fruticosum (Decne.) D.V. Field (118/72, 122/75, 761, 1049) 53
Boerhavia coccinea Mill. var. *viscosa* (Lag. & Rodr.) R. M. Mosc. (667, 944, 1042) 374
Boerhavia elegans Choisy (1637, 3100) 375
Boerhavia repens L. (1216, 1568, 2760, 3368, 4751) 375
 Boraginaceae 76
 **Boscia angustifolia* A. Rich. (2105) 93
Brandella erythraea (Brand) Mill. (1701, 2157, 2596) 78
Brassica rapa L. (4250) 194
Brassica tournefortii Gouan (3353) 194
Buddleja polystachya Fres. (2127, 2773) 352
Buglossoides arvensis (L.) I.M. Johnston (616, 984, 2153) 78
Bupleurum gerardii All. (605, 3561) 482
 Burseraceae 88
 Cadaba farinosa Forssk. (95/72, 4/75, 245, 1048, 1459) 93
Cadaba glandulosa Forssk. (107/72, 630) 94
Cadaba longifolia DC. (649, 1956) 94
Cadaba rotundifolia Forssk. (1161, 1921) 94
Cadia purpurea (Picciv.) Ait. (2082) 301
Cakile arabica Velen. (1002) 195
Calendula arvensis L. (49 & 280/74, 334, 621, 863, 1109) 142
Calendula tripterocarpa Rupr. (101, 2456) 142
Calligonum crinitum Boiss. ssp. *arabicum* (Sosk.) Sosk. (4160) 401
Calligonum polygonoides L. ssp. *comosum* (L'Her.) Sosk. (2065) 402
Callipeltis aperta Boiss. & Buhse (422, 4012) 428
Callipeltis cucullaria (L.) Rothm. (2175) 428
Calotropis procera (Ait.) Ait. f. (780) 53
Campanula dulcis Decne. (2188) 92
Campanula edulis Forssk. (567, 1315, 2592) 92
 **Campanula* sp. aff. *edulis* Forssk. (565, 1174) 92
 **Campanula* sp. (3794, 4972) 93
 Campanulaceae 92
Campylanthus pungens Swartz (222, 579, 822) 444
Canthium phyllanthoides Baill. (2063, 2101, 2812) 428
Canthium schimperianum Rich. (3577) 429
 Capparaceae 93
Capparis cartilaginea Decne. (11, 728, 2383) 94
Capparis decidua (Forssk.) Edgew. (114/72, 635, 735) 95
Capparis spinosa L. (520, 670, 875, 2066, 4277, 4495) 95
 **Capparis tomentosa* Lam. (2974) 95
 Caprifoliaceae 100
Capsella bursa-pastoris (L.) Medic. (1377) 195
 **Caralluma commutata* Berger (2216, 2618, 2818) 54
 **Caralluma* sp. aff. *commutata* Berger (2976, 3292, 4473) 54
 **Caralluma deflersiana* Lavr. (2223) 54
Caralluma edulis (Edgew.) Benth. (1937) 55
 **Caralluma eremastrum* Schwartz (3518) 55
Caralluma penicillata (Defl.) N.E. Br. (2039, 2615, 2722) 55
 **Caralluma petraea* Lavr. (22/75, 1303, 1489, 2670) 56
Caralluma plicatiloba Lavr. (303, 752, 753, 4374) 56
Caralluma quadrangula (Forssk.) N.E. Br. (13/75, 272, 676) 57
Caralluma russelliana (Courb. ex Brongn.) Cufod. (625, 656, 661, 2166) 56
 **Caralluma shadhbana* Lavr. (2706) 57
Caralluma shadhbana Lavr. var. *barhana* Lavr. (1450, 2021, 2707) 57
 **Caralluma sinaica* (Decne.) Benth. (441, 840, 4375) 57
 **Caralluma sinaica* (Decne.) Benth. var. *baradii* Lavr. (1477, 1490) 58
Caralluma subulata (Forssk.) Decne. (1938, 2727) 58
Caralluma wissmanni Schwartz (271, 1278, 2654) 58
Cardaria draba (L.) Desv. (2126) 195
Carduus gratus Pomel. (2493) 142
Carduus pycnocephalus L. (484, 1141, 2528) 143
Carex distans L. (1374) 216
 **Carex divisa* Huds. (4938) 216
Carissa edulis (Forssk.) Vahl (2151, 2595) 51
Carrichtera annua (L.) DC. (3437) 195
 **Carthamus nitidus* Boiss. (2535) 143
Carthamus oxyacantha M. Bieb. (2543) 143
 Caryophyllaceae 100
Cassia holosericea Fres. (143, 791) 302
Cassia italica (Mill.) Lam. ex Steud. (136) 302
Cassia occidentalis L. (2728) 302
Cassia senna L. (1950) 303
Cassia tora L. (2972) 303
Cassytha filiformis L. (3280) 284
Cayulsea hexagyna (Forssk.) M.L. Green (832, 1083, 1896, 3367, 4765) 418
 Celastraceae 113
Celosia polystachya (Forssk.) C. C. Townsend (3886, 4670) 43
 **Celosia trigyna* L. (3700) 43
Celtis africana Burm. f. (2140) 480
Centaurea ammocyanus Boiss. (4245) 143
Centaurea eryngioides Lam. (4377) 144
Centaurea mesopotamica Bornm. (2431) 145
Centaurea pseudosinaica Czerep. (212, 424, 899, 911, 1018, 1081, 2471, 3806) 145
Centaurea schimperii DC. (1387, 4356) 145
Centaurea scoparia Sieb. (3456, 4064) 146
Centaurea sinaica DC. (4228, 4246) 146
 **Centaurea* cf. *sinaica* DC (4416) 146
Centaurea solstitialis L. ssp. *solstitialis* (1479, 2070) 146
Centaureum pulchellum (Sw.) Druce (2176) 251
Centaureum sp. (2599) 251
Centaurothamnus maximus Wagenitz & Ditt. (3555) 147
Centella asiatica (L.) Urb. (1400, 2131, 3657) 482
 **Cerastium dichotomum* L. var. *inflatum* (Link) Cullen (983) 101
Ceropegia arabica Huber (3158x) 59
 **Ceropegia* sp. aff. *arabica* Huber (3158) 59
 **Ceropegia* sp. nov. aff. *aristolochioides* Decne. (2111) 59
Ceropegia devechii Chiov. (1996) 59
 **Ceropegia* sp. aff. *devechii* Chiov. var. *adelaidae* Bally (2217, 2617) 60
 **Ceropegia mansouriana* Chaudhary & Lavr. (2616) 60
 **Ceropegia superba* D.V. Field & Collett (3159) 60
 **Ceropegia tihamana* Chaudhary & Lavr. (1998) 61
 **Ceropegia* sp. aff. *variegata* Decne. (3599) 61
 **Ceropegia* sp. nov. 3160 (3160, 3521) 61
 **Ceropegia* sp. 3281 (3281) 61
 **Ceropegia* sp. 3324A (3324A, 3328) 62
 **Ceropegia* sp. 3326 (3326, 3327) 62
 **Ceropegia* sp. 3329 (3329) 62
 **Ceropegia* sp. 3603 (3602, 3603) 63
Ceterach officinarum DC. (66/74, 103/74, 1115) 408
Chascanum marrubifolium Fenzl ex Walp. (1065, 1933) 444
Cheilanthes coriacea Decne. (218/74, 183, 2659, 2960) 408
Cheilanthes marantae (L.) Domin (3319) 408
Cheilanthes pteridioides (Reichard) C. Chr. (158/74, 1116, 1806, 2395, 2423) 409
Cheilanthes vellea (Ait.) F. Mueller (4018) 409
 Chenopodiaceae 115
Chenopodium album L. (1549, 1629, 4460) 118
Chenopodium ambrosioides L. (4459) 119
Chenopodium murale L. (1760) 119
Chenopodium opulifolium Schrad. ex Koch & Ziz (1729) 119
Chenopodium schraderianum Schultes (1192) 119
 **Chorispora purpurascens* (Banks & Sol.) Eig (4255) 196
Chrozophora oblongifolia (Del.) Juss. ex Spreng. (1041, 1464, 2002) 235
Chrozophora tinctoria (L.) Raf. (694, 1152, 1920, 2460) 236
 **Cicer cuneatum* Hochst. ex Rich. (3559) 303
Cichorium botaie Defl. (311, 2060) 147
Cichorium intybus L. (1105A, 1728) 147
Cienfuegosia welshii (T. Anders.) Garcke (1480) 360
Cineraria abyssinica Sch. Bip. (4577) 147
Cirsium vulgare L. (1273) 148
Cissus quadrangularis L. (754) 498
Cissus rotundifolia (Forssk.) Vahl (1205) 498
 Cistaceae 129
Cistanche phelypaea (L.) Cout. (798, 2458) 382
 **Cistanche tubulosa* (Schenk.) R. Wight forma *albiflora* Gilli (3566) 382
 **Cistanche violacea* (Desf.) G. Beck (3469) 383
Citrullus colocynthis (L.) Schrad. (59, 246, 902) 209
Citrullus lanatus (Thunb.) Mats. & Nakai (808) 210
Clematis incisodentata A. Rich. (1324, 2131, 2204) 416
Clematis simensis Fresen. (2931) 416
Cleome amblyocarpa Barratte & Murb. (38, 1577, 1620, 1861) 96
Cleome brachycarpa Vahl (86, 640, 1500) 96
 **Cleome brachystyla* Defl. (4860) 96
Cleome chrysantha Decne. (2, 1155, 1583) 96
Cleome droserifolia Del. (71/72, 687, 4511) 97
 **Cleome* sp. aff. *droserifolia* Del. (3763) 97
Cleome paradoxa R. Br. (1413, 1934, 4744) 97
Cleome scaposa DC. (1220, 1597) 97
Cleome schweinfurthii Gilg (1089, 1708, 2037) 98
Cleome trinervia (DC.) Hedge (206, 426, 845, 1790, 4797) 98
Cleome viscosa L. (1219, 2037) 98
Clitoria ternata L. (3559, 2022) 303
Cluytia myricoides Jaub. & Spach (47/72, 99, & 151/74, 1544) 236
Clypeola jonthlaspi L. (1743) 196
Cnicus benedictus L. (2161, 2653) 148
Coccinea grandis (L.) J.O. Voigt (172, 344, 1247, 1734) 210
 **Cocculus hirsutus* (L.) Diels. (3900) 366
Cocculus pendulus (J.R. & G. Forst.) Diels. (936, 1575, 1652) 367
Colchicum sp. aff. *ritchii* R. Br. (463, 856, 857) 348
Colutea istria Mill. (704, 897, 4780) 304
 Combretaceae 131
 **Combretum aculeatum* Vent. (4714) 131
Combretum molle R. Br. ex D. Don (2203, 2602) 132
Cometes abyssinica R. Br. (416, 557, 782, 3787) 101
Cometes surattensis L. (2669) 101
Commelina africana L. var. *villosior* (C. B. Cl.) Brenan (348, 1268, 1357, 2629) 133
Commelina albescens Hassk. (404, 2679) 133
Commelina sp. aff. *albescens* Hassk. (1981) 133
Commelina benghalensis L. (228, 1541) 134
Commelina forsskahlei Vahl (604, 1654, 1695) 134
 Commelinaceae 133
Commicarpus grandiflorus (A. Rich.) Standl. (1084, 1558) 375
Commicarpus helenae (J.A. Schultes) Meikle (681, 783, 1506, 1564, 1929) 376
Commicarpus plumbagineus (Car.) Standl. (662, 1226, 1750, 1675) 376
Commicarpus sinuatus Meikle (1189, 1437) 376
Commicarpus squarrosus (Heimerl) Standl. (195/74, 1444) 376
Commiphora erythraea (Ehrenb.) Eng. (4832) 88
Commiphora sp. aff. *erythraea* (Ehrenb.) Eng. (2813) 89
Commiphora gileadensis (L.) C. Christ. (1213, 1938, 2025) 89
 **Commiphora* sp. aff. *gileadensis* (L.) C. Christ. (648, 784) 89
Commiphora kataf (Forssk.) Engl. (3250, 3252) 90
 **Commiphora kataf* (Forssk.) Engl. forma vel. sp. aff. 2105 (2105) 90
 **Commiphora kataf* (Forssk.) Engl. forma vel. sp. aff. 3105 (1951, 3105) 90
 **Commiphora madagascariensis* Jacq. forma vel. sp. aff. 1466 (1466, 1647) 90
 **Commiphora madagascariensis* Jacq. forma vel. sp. aff. 3154 (3154) 91
Commiphora myrrha (Nees) Engl. (2814, 2876) 91
 **Commiphora* sp. nov. aff. *myrrha* (Nees) Engl. (188, 2993) 91
Commiphora quadricincta Schweinf. (555, 1904, 1918, 2004) 91
 Compositae 135
Conium maculatum L. (4921) 483
 Convolvulaceae 180
Convolvulus arvensis L. (1066, 1110, 1317) 180
Convolvulus cephalopodus Boiss. (974, 4159) 181
Convolvulus deserti Hochst. (69, 118, 796) 181
Convolvulus fatmensis Kunze (1753) 181
Convolvulus glomeratus Choisy (69/72, 679) 181
Convolvulus hysterix Vahl (12) 182
Convolvulus lanatus Vahl (2510) 182
Convolvulus oxyphyllus Boiss. (1851) 182
Convolvulus pilosellifolius Desr. (2521) 182
Convolvulus prostratus Forssk. (2418, 4143) 183
Convolvulus rhynchospermus Hochst. ex Choisy (1162, 1964, 2636, 4740) 183
 **Convolvulus siculus* L. (4800) 183
Convolvulus spicatus Peter ex Hallier f. (2497, 2844) 183
 **Convolvulus* sp. nov. (1454, 1686, 2661) 184
Conyza bonariensis (L.) Cronq. (1633, 2803) 148
Conyza gouanii (L.) Willd. (2950) 148
Conyza hochstetteri Sch. Bip. (1200, 1283, 1893B, 3576) 149
Conyza incana Willd. (294, 2161, 3819, 3823) 149
Conyza pyrropappa Sch. Bip. (3385) 149
Conyza stricta Willd. (382, 493, 1129, 1799) 149
Corallorhiza epigeus (Roettl.) C. B. Cl. (3191) 210
Corallorhiza schimperii (Naud.) Hook. f. (1928, 1965, 2020, 2213) 210
Corbichonia decumbens (Forssk.) Exell (1159, 1773) 37
Corchorus antichorus (L.) Raeusch. (792, 1955) 474
Corchorus olitorius L. (4635) 474
Corchorus trilocularis L. (1070, 1900) 474
Cordia africana Lam. (3901) 78
Cordia ovalis R. Br. ex DC. (2607) 79
Cordia sinensis Lam. (1465, 2078) 79
Cornulaca monacantha Del. (1868) 120
Cornulaca sp. (3811) 120
Cotoneaster racemiflorus C. Koch (1343, 3564) 425
 **Crassocephalum bojeri* DC. (3531) 150
Crassula alba Forssk. (574B, 2718, 4334) 188
Crassula schimperii Fisch. & Mey. (24/72, 112/74, 1117, 2589) 189
 Crassulaceae 188
 **Crataegus sinaica* Boiss. (4919) 426
Craterostigma pumilum Hochst. (221, 1183) 44
Crepis foetida L. (1721, 2582) 150
Crepis rupeellii Sch. Bip. (1284, 4908, 4937) 150
Crepis sancta (L.) Babc. (530, 2149) 150
 **Crepis* sp. (943) 151
Cressa cretica L. (1030) 184
Crinum yemensense Defl. (758, 2932) 44
Crossandra wissmannii O. Schwartz (589, 2028) 29
Crotalaria aegyptiaca Benth. (880, 2123) 304
Crotalaria emarginella Vatke (1148) 304
Crotalaria leptocarpa Balf. f. (2980, 4155) 304
Crotalaria microphylla Vahl (1076, 2634, 2635) 305
Crotalaria quartianiana A. Rich. (5125) 305
 **Crotalaria senegalensis* (Pers.) Bacle ex DC. (4728) 305
 **Crotalaria* sp. nov. (4600) 305
 **Croton lobatus* L. (3705) 236
Crucianella ciliata Lam. (2886) 429
Crucianella membranacea L. (937) 429
 Cruciferae 192
Ctenolepis cerasiformis (Stocks) Hook. f. (2009) 211
Cucumis figareii Del. ex Naud. (2973) 211
Cucumis melo L. (2381) 211
Cucumis melo L. var. *agrestis* Naud. (1978, 1999) 211
Cucumis prophetarum L. var. *dissectus* (Naud.) C. Jeffrey (1923) 212
Cucumis prophetarum L. var. *prophetarum* (94, 178, 407, 556, 663, 748, 900, 1621) 212
Cucumis sp. aff. *prophetarum* L. (2000) 212
 Cucurbitaceae 209
 Cupressaceae 214
Cuscuta campestris Yunker (4877) 184
 **Cuscuta hyalina* Roth. (3259) 184
Cuscuta planiflora Tenore (8, 696, 849, 1887, 2440) 185
Cynomopsis senegalensis Guill. & Perr. (1044) 306
 **Cyanotis nyctitropa* Defl. (2691) 134
Cymbolaena griffithii (A. Gray) Wagenitz (1008) 151
Cynanchum tetrapterum (Turcz.) R.A. Dyer (3157) 63
Cynoglossum bottae Defl. (561, 1380, 2041) 80
 **Cynoglossum lanceolatum* Forssk. (3162, 3262) 80
 Cynomoriaceae 215
Cynomorium coccineum L. (992, 4759) 215
 Cyperaceae 216
Cyperus alopecuroides Rottb. (4630) 217
Cyperus alternifolius L. ssp. *flabelliformis* Rottb. (3864) 217
Cyperus articulatus L. (2011) 217
Cyperus aucheri Jaub. & Spach (2502) 217
Cyperus conglomeratus Rottb. (1529, 2208) 218
Cyperus conglomeratus Rottb. var. *effusus* (Rottb.) Kukk. (3255) 218
Cyperus jemicinus Rottb. (2745) 218
Cyperus laevigatus (2778, 3123, 3379, 3734) 218
Cyperus laevigatus L. var. *caespitosus* C. B. Cl. (170/72) 219
Cyperus michelianus (L.) Del. ssp. *pygmaeus* (Rottb.) Asch. & Graebn. (3863) 219
Cyperus niveus Retz. (3267) 219
Cyperus obtusiflorus Vahl (2474, 3348) 219
Cyperus rigidifolius Steud. (3514, 3650) 220
Cyperus rotundus L. (2865, 2866, 3344, 3696) 220
Cyperus rubicundus Vahl (3242) 220
Cyperus schimperianus Steud. (3515, 3643) 220
Cyperus sp. aff. *schimperianus* Steud. (1678) 221
Cyphostemma digitatum (Forssk.) Descouings (1143) 498
 **Dalechampia scandens* L. var. *cordofana* (Hochst. ex Webb) Muell. Arg. (4695, 4821) 236
 **Daphne linearifolia* Hart (707, 723, 4533) 473
 **Daphne mucronata* Royle (3791) 473
Datura fastosa L. (3730) 459
Datura innoxia Mill. (2382) 460
Datura stramonium L. (952, 1209, 2100) 460
 **Delosperma hazarianum* (Defl.) Popp. & Ihl. (360, 574) 36
 **Delphinium sheilae* Kit Tan (4531) 417
Delonix elata (L.) Gamble (60/72, 660, 1211) 306
Desmodium gangeticum (L.) DC. (3540) 306
Dianthus sinensis Boiss. (2879) 102
Dianthus strictus Banks & Sol. (4348) 102
Dianthus uniflorus Vahl (566, 1172) 102
Dianthus zonatus Fenzl. (369, 609, 1334) 102
Dichondra repens J. R. & G. Forst. (1270) 185
Dichrocephala crysanthemifolia (Blume) DC. (352, 564, 1199) 151
Dichrostachys cinerea (L.) Wight & Arn. (3579) 307
Dicoma tomentosa Cass. (4286) 151
Digera muricata (L.) Mart. (1758) 43
Diospyros mespiliformis Hochst. ex DC. (3710) 227
Diplotaxis acris (Forssk.) Boiss. (30, 2516) 196
Diplotaxis erucoides (L.) DC. (4256) 196

- Diplotaxis harra* (Forssk.) Boiss. (428, 476, 846, 946) 197
- Dipsacaceae 225
- Dipcadi serotinum (L.) Medik. (17, 924, 1864) 349
- Dipcadi viride (L.) Moench (1187, 1829, 2063) 349
- Dipterygium glaucum Decne. (115/72, 19/75, 677) 98
- Dobera glabra (Forssk.) Poir. (1946) 437
- Dodonaea viscosa L. (821, 3269) 438, 439
- Dolichos trilobus L. (3152B, 3534) 307
- Dorstenia foetida (Forssk.) Schweinf. & Engl. (1951, 2694) 367
- Dracaena serrulata Bak. (628, 1291) 34
- Dregea schimperii (Decne.) Bullock (2594, 3880) 63
- Drimia maritima (L.) Stearn (395, 2802, 3825) 349
- Ducrosia anethifolia (DC.) Boiss. (2550) 483
- *Ducrosia flabellifolia Boiss. (3764) 483
- Duvalia sulcata N.E. Br. (2816, 3741) 64
- Duvalia sulcata N.E. Br. var. semi-nuda Lavr. (1991, 2704) 64
- *Duvalia velutina Lavr. (1997, 2215, 2708, 2726, 3945, 4834) 65
- Ebenaceae 227
- Ecbolium gymnostachyum (Nees) Milne-Redh. (1468) 30
- Ecbolium violaceum J. R. I. Wood & Hilcoat (1453) 30
- Ecbolium viride (Forssk.) Alston (224, 1047) 30
- Echinops glaberrimus DC. (508, 4376) 152
- Echinops spinosissimus Turra (2664) 152
- Echinops viscosus DC. (2432) 152
- *Echinops sp. 1570 (945, 1570) 152
- *Echinops sp. 3761 (3761) 153
- *Echinops sp. 4116 (4116) 153
- Echiochilon fruticosum Desf. (977) 80
- *Echiochilon sp. (1646) 80
- Echium longifolium Del. (903, 1305, 1717, 1839) 81
- Eclipta alba (L.) Hassk. (1206, 1602, 1749) 153
- *Ehretia cymosa Thonn. (3138) 81
- Elantaceae 229
- Eleocharis sp. aff. atropurpurea (Retz.) Presl. (3653) 221
- Eleocharis marginulata Hochst. (3659) 221
- Emex spinosus (L.) Campd. (923, 1674, 1725) 402
- Endostemon gracile (Benth.) Ashby (3277) 268
- Endostemon tenuiflorus (Benth.) Ashby (1988) 268
- Ephedra alata Decne. (2488, 2489, 3465) 230
- Ephedra sp. aff. alata Decne. (505, 711) 230
- Ephedra sp. aff. foliata Boiss. ex C.A. Mey. 2443 (930, 1794, 1859, 2443, 2444) 231
- Ephedra sp. aff. foliata Boiss. ex C.A. Mey. 1410 (1053, 1127, 1410, 2917, 2953) 231
- Ephedra intermedia Schrenk & C. A. Mey. (1367) 232
- *Ephedra cf. transitoria Riedl (4896) 232
- *Ephedra sp. 1491 (1491) 232
- Ephedraceae 230
- Epilobium hirsutum L. (2929) 379
- Equisetaceae 233
- Equisetum ramosissimum Desf. (1356, 4452) 233
- Eremobium aegyptiacum (Spreng.) Boiss. (2503) 197
- Eremobium aegyptiacum (Spreng.) Boiss. ssp. lineare (Del.) Asch. & Schweinf. (882) 197
- Erica arborea L. (367, 1349) 233
- Ericaceae 233
- *Erodium ciconium (L.) L'Her. (4252) 253
- Erodium cicutarium (L.) L'Her. (46/74, 1091) 253
- Erodium crassifolium L'Her. (446) 253
- Erodium deserti (Eig) Eig (286, 1803, 2519) 254
- Erodium glaucophyllum (L.) Ait. (911A, 3475, 4241) 254
- Erodium laciniatum (Cav.) Willd. var. glandulosopilosum Viern. (449, 4254, 4768) 254
- Erodium moschatum (L.) L'Her. (3550) 254
- Erodium neuradifolium Del. (880, 890, 891, 1108) 255
- Erodium oxyrrhynchum M. Biel. (71A, 419, 828, 911, 4259, 4278) 255
- Erodium pulverulentum (Cav.) Willd. (78, & 135/74, 1855) 255
- Eruca sativa Mill. (1316) 199
- Erucaria crassifolia (Forssk.) Del. (1874) 198
- Erucaria hispanica (L.) Druce (2492, 2529) 198
- Erucarium arabicum Fisch. & Mey. (1627) 199
- *Eryngium glomeratum Lam. (4384, 4526) 484
- *Erythrocoeca abyssinica Pax (4657) 236
- Euclea schimperii (A. DC.) Dandy (2156, 2597) 228
- Enicostemma axillare (Lam.) A. Raynal (3146) 251
- Euphorbia petersii (Rchb. f.) Rchb. f. (1296, 3568) 381
- Euphorbia ammak Schweinf. (5127) 237
- *Euphorbia sp. aff. ammak Schweinf. (627, 1145) 237
- Euphorbia arabica (Hochst. & Steud.) Boiss. (1689) 238
- Euphorbia balsamifera Ait. ssp. adenensis (Defl.) Bally (1428, 1615) 238
- Euphorbia cactus Ehrenb. (1936, 3208) 238
- *Euphorbia sp. aff. cactus Ehrenb. (3784, 4979) 239
- Euphorbia chamaepeplus Boiss. & Gaill. (989) 239
- Euphorbia cuneata L. (1214) 240
- Euphorbia dracunculoides Lam. (3838, 4075) 240
- Euphorbia falcata L. ssp. falcata var. falcata (1724, 4871) 240
- Euphorbia fractiflexa S. Carter & J. R. I. Wood (2219) 241
- *Euphorbia sp. aff. fractiflexa S. Carter & J. R. I. Wood (4836) 241
- Euphorbia glomerifera (Mills.) Wheeler (4664) 242
- Euphorbia gorinii Chiov. (1959) 242
- Euphorbia granulata Forssk. (806, 1531, 2841) 242
- Euphorbia granulata Forssk. var. glabrata (Gay) Boiss. (1703, 2759) 242
- Euphorbia helioscopia L. (1106, 1373, 1748) 243
- Euphorbia heterophylla L. (1624) 243
- Euphorbia hirta L. (1566) 243
- Euphorbia inaequilatera Sond. (269/74, 1786) 243
- Euphorbia inarticulata Schweinf. (1223) 244
- *Euphorbia sp. aff. parciarmulosa Schweinf. (1973, 4315) 244
- Euphorbia retusa Forssk. (521, 996) 245
- Euphorbia schimperii Presl (388, 403, 408, 823) 245
- Euphorbia sp. aff. schimperii Presl (2107) 245
- Euphorbia schimperiana Scheele (1274, 2056) 246
- Euphorbia scordifolia Jacq. (1043, 1527, 2757, 2785, 2786) 246
- Euphorbia serpens Kunth (2762) 246
- Euphorbia triaculeata Forssk. (1238, 1992) 246
- *Euphorbia sp. (4724) 247
- Euphorbiaceae 234
- Euryops arabicus Steud. (48/72, 462, 1087) 153
- Evulvulus alsinoides L. (1983) 185
- Fagonia bruguieri DC. (37, 1112, 1622, 1656, 1836, 1850, 2537) 500
- Fagonia glutinosa Del. (993, 1831, 1857) 501
- Fagonia indica Burm. f. (1257, 3102) 501
- Fagonia paulayana Vierh. (680, 1580) 501
- Fagonia schweinfurthii Hadidi (4144) 501
- Fagonia tenuifolia Hochst. & Steud. ex Boiss. (515, 929) 502
- Fagonia tristis Sickenb. var. boveana Hadidi (445, 734, 1014) 503
- *Falkia oblonga Krauss (4483) 185
- Farsetia aegyptia Turra (74, 457, 905, 1781) 199
- Farsetia burtonae Oliv. (517, 908, 1824) 200
- Farsetia longisiliqua Decne. (286/74, 34, 477) 200
- Farsetia tenuifolia Hochst. ex Boiss. (764, 1516, 1567, 1777, 2405) 200
- Felicia abyssinica A. Rich. (12, & 178/72, 73, & 201/74, 674, 1169) 154
- Felicia dentata (A. Rich.) Dandy (48, & 105/74, 284, 1118) 154
- Ferula communis L. (502, 751, 1323, 3620) 484
- Ferula communis L. ssp. glauca (L.) Rouy & Camus (3850) 485
- *Ferula ovina Boiss. (504, 4387) 485
- Ferula rubraensis C.C. Townsend (3429) 485
- Ficus carica L. Forssk. (349, 494, 871, 2090, 2798) 368
- *Ficus carica L. forma (1001, 3844) 368
- Ficus sp. aff. glumosa Del. var. glaberrima Martelli (1772, 2190) 368
- Ficus ingens (Miq.) Miq. (1328) 369
- Ficus populifolia Vahl (4845) 369
- Ficus salicifolia Vahl (160, 161, 513, 529, 535, 872) 369
- Ficus sycomorus L. (1751) 370
- Ficus vasta Forssk. (2700) 370
- Filago desertorum (Pomel) Wag. (496, 1010, 1126, 1901, 2481) 154
- Fimbristylis bisumbellata (Forssk.) Bub. (3872) 221
- Fimbristylis sieberiana Kunth (3646) 222
- Fimbristylis spathacea Roth (3727) 222
- Flaveria trinervia (Spreng.) Mohr. (1498) 154
- Foeniculum vulgare Mill. (2121) 486
- Forskoalea tenacissima L. (803) 490
- Forskoalea viridis Ehrenb. (3258) 491
- Frankenia pulverulenta L. (1679) 250
- Frankeniaceae 250
- *Fuirena pubescens (Lam.) Kunth (3663) 222
- *Fumana arabica (L.) Spach (4973) 129
- Fumaria parviflora Lam. (458, 982, 1723) 389
- Gagea reticulata (Pallas) Schultes & Schultes f. (412, 500, 1741, 3358) 350
- Galium aparine L. (2642) 429
- Galium aparinoides Forssk. (453, 3182) 430
- Galium ceratopodium Boiss. (2147) 430
- Galium kahelianum Deff. (427, 702, 750, 4341) 430
- Galium setaceum Lam. ssp. decaisnei (Boiss.) Ehrend. (2189, 2422) 430
- Galium spurium L. var. africanum Verdc. (878) 431
- Galium tricornutum Dandy (3340, 3357) 431
- Galium yemense Kotschy (2576) 431
- Galium yemense Kotschy sensu lato (3487) 431
- *Galium sp. 2892 (2892) 432
- *Galium sp. 3375 (3375) 432
- Gastrocystis hispida (Forssk.) Bge. (827, 2165, 2436) 81
- Gentianaceae 251
- Geraniaceae 253
- Geranium arabicum Forssk. (321, 1397, 2044) 255
- Geranium mascatense Boiss. (4811) 256
- Geranium molle L. (324, 1263, 1265, 3501, 3551) 256
- Geranium ocellatum Camb. (285, 323, 1252, 1399, 1715) 256
- Geranium rotundifolium L. (985, 3501X) 256
- Geranium trilophum Boiss. (1399B) 257
- Geranium sp. aff. trilophum Boiss. (1903, 1908) 257
- Gladolus dalenii Van Geel (389, 1120) 262
- Gisekia pharnaceoides L. (13/72, 180, 768, 1164) 37
- Glauclium arabicum Fres. (522) 389
- Glinsu lotoides L. (1502) 37
- Globularia arabica Jaub. & Spach (468, 4770) 259
- Globulariaceae 259
- Glossonema boveanum Decne. (131, 787) 65
- Glossonema edule N.E. Br. (1613) 66
- Glossostemon bruguieri DC. (2411) 468
- Glycine wightii (Wight & Arn.) Verdc. ssp. longicauda (Schweinf.) Verdc. (3495, 3530, 3903) 307
- Gnaphalium luteo-album L. (1369, 1642) 155
- Gnidia somalensis (Franch.) Gilg (1173) 473
- Gomphocarpus fruticosus (L.) R. Br. & Ait. f. (612, 1325, 2593) 66
- Gomphocarpus sinaicus Boiss. (1888, 2638) 66
- Gossypium hirsutum L. var. punctatum (Schum. & Thonn.) Hutch. (1037) 360
- Grewia erythraea Schweinf. (1024, 4799) 475
- *Grewia sp. aff. erythraea Schweinf. (3402) 475
- Grewia mollis Juss. (2035, 2604) 475
- Grewia tembensis Fresen. (1441, 2032) 476
- Grewia tenax (Forssk.) Fiori (1052, 1939, 2711) 476
- Grewia velutina Vahl (1210) 476
- Grewia villosa Willd. (239, 2038) 476
- *Grewia sp. (Wadi al Uss) 2104 (2104) 477
- *Grewia sp. (Hadda) 3220 (1543, 3220) 477
- *Grewia sp. (Fayfa) 3273 (3273) 477
- Gymnarrhena micrantha Desf. (2414) 155
- Gymnocarpus decandrum Forssk. (416, 1784) 103
- Gynandirix sisyrinchium (L.) Parl. (885) 263
- Gynandrophila gynandra (L.) Briq. (811) 99
- Gypsophila antari Post & Beauv. (542, 948B, 2465) 103
- Gypsophila sp. aff. antari Post & Beauv. (1463, 2076, 2122) 103
- *Gypsophila sp. (2184) 103
- Halocnemum strobilaceum (Pall.) M. Bieb. (2449) 120
- Halogeton sp. (3808, 3814) 120
- Haloplepis perfoliata (Forssk.) Bunge (1057) 121
- Haloragaceae 260
- Haloxylon ammodendron (Cam.) Bunge (3455) 121
- Hammada salicornica (Moq.) Iljin (691, 2832) 121
- Hammada scoparia (Pomel) Iljin (1569, 2750) 122
- Haplophyllum tuberculatum (Forssk.) A. Juss. (83, 217, 738, 1651, 1841) 435
- Hedynopsis cretica (L.) Dum.-Cours. (291, 622, 1335) 155
- Helianthemum kahiricum Del. (1798, 1833) 130
- Helianthemum ledifolium Spach (2565) 130
- Helianthemum lippii (L.) Dum.-Cours. (73, 465, 466, 729, 1098, 4507) 130
- Helianthemum salicifolium (L.) Miller (3461, 4262) 131
- Helianthemum stipulatum (Forssk.) Christen. (1805) 131
- Helichrysum foetidum L. var. microcephalum A. Rich. (2652) 155
- Helichrysum forsskahlei (Gmel.) Hilliard & Burt (350, 1198, 1386) 156
- Helichrysum glumaceum DC. (205/74, 224, 1086) 156
- Heliotropium arbainense Fresen. (742, 1571) 81
- Heliotropium curassavicum L. (2747) 82
- Heliotropium digynum (Forssk.) Asch. & C. Christ. (921) 82
- Heliotropium dolosum De Not. (1931) 82
- Heliotropium lasiocarpum Fischer & C.A. Meyer (2207) 82
- Heliotropium longiflorum Hochst. & Steud. (1072, 1235, 1563, 1601) 83
- Heliotropium pterocarpum Hochst. & Steud. (789, 1054) 83
- Heliotropium ramosissimum (Lehm.) DC. (1667, 1685, 1802, 2429) 83
- Heliotropium rariflorum Stocks (1460, 1659, 4959) 83
- Heliotropium strigosum Willd. (824, 1028, 1154, 1697) 84
- Heliotropium subulatum (DC.) Martelli (551, 1718) 83
- Herniaria hirsuta L. (2587) 104
- *Hibiscus sp. aff. aponeurus Sprague & Hutch. (2186, 2384) 360
- Hibiscus deflersii Schweinf. (1234, 2388) 360
- Hibiscus micranthus L. f. (685, 1244, 1443, 1494, 3325) 361
- Hibiscus somalensis Franch. (1432, 2667) 361
- Hibiscus trionum L. (1643) 361
- Hibiscus vitifolius L. (592, 1233, 1969) 361
- Hippocrepis bicontorta Lois. (2496) 308
- Hippocrepis ciliata Willd. (217, 4003) 308
- Hippocrepis sp. aff. ciliata Willd. (1785) 308
- Hippocrepis constricta Kunze (737, 740) 308
- Hippocrepis unisiliquosa L. (2553) 309
- Hochstetteria schimperii DC. (1525) 156
- *Holosteum umbellatum L. var. glutinosum (M. Bieb.) Gay (966) 104
- *Holothrix arachnoidea Rchb. f. (371, 1119) 380
- Hormuzakia aggregata (Lehm.) Guzul. (1813, 2404) 84
- Horwoodia dicksoniae Turrill (1863, 2487) 200
- *Huernia sp. nov. aff. boleana Gilb. (633, 755, 815, 1309, 2224, 2655) 67
- Huernia lodarensis Lavr. (1482, 3302) 67
- *Huernia saudi-arabica D.V. Field (549, 756, 1280, 2220) 68
- *Huernia sp. 643 (643, 1275, 3180) 67
- *Huernia sp. 1176 (3743) 68
- *Huernia sp. 3743 (757, 1176, 2227, 2627, 2633) 68
- *Hydnora johannis Becc. (1485) 260
- Hydnoraceae 260
- Hyoscyamus albus L. (1606) 460
- Hyoscyamus cf. aureus L. (988, 4378) 461
- Hyoscyamus desertorum (Asch. ex Boiss.) Tackholm (4236) 461
- Hyoscyamus muticus L. (4408) 461
- Hyoscyamus pusillus L. (861, 2525, 4756, 4788) 462
- *Hyoscyamus sp. (3761) 462
- Hypericum cot. geslinii Coss. & Kral (972, 2477) 389
- Hypericum pendulum L. (480, 868, 3434) 390
- Hypericaceae 261
- Hypericum annulatum Moris (3536) 261
- Hypericum hircinum L. (1396, 2129) 261
- Hypericum revolutum Vahl (357) 261
- *Hypericum sp. aff. sinaicum Hochst. ex Boiss. (1401) 262
- Hyphaene thebaica (L.) Mart. (21) 386
- *Hypochoeris glabra L. (3491) 156
- Hyposotes forskalei (Vahl) Roem. & Schult. (30/72, 819, 1545) 30
- Ifiga spicata (Forssk.) Sch. Bip. (107, 2413) 157
- Indigofera arabica Jaub. & Spach (1188, 2083, 2658) 309
- Indigofera articulata Gouan (75/72, 2809, 3276, 4825) 309
- Indigofera caerulea Roxb. var. caerulea (4825) 309
- Indigofera colutea (Burm. f.) Merrill (1930, 4820) 310
- Indigofera disjuncta Gillett (636) 310
- Indigofera hochstetteri Bak. (1761) 310
- Indigofera linifolia (L. f.) Retz. (4823) 310
- Indigofera oblongifolia Forssk. (1416, 1994) 311
- Indigofera philippiae Bak. f. (3508, 3861) 311
- Indigofera schimperii Jaub. & Spach. (844, 1449, 4789) 311
- Indigofera semitrijuga Forssk. (4176, 4827) 311
- Indigofera sessiliflora DC. (1165) 312
- Indigofera spiniflora Hochst. & Steud. ex Boiss. (3365) 312
- Indigofera spinosa Forssk. (794) 312
- *Indigofera ? trita L. f. (3533) 312
- *Indigofera sp. aff. trita L. f. (1899, 1952, 4696) 313
- Indigofera tritoides Bak. (683) 313
- *Indigofera sp. aff. volkensii Taub. (3278) 313
- *Indigofera sp. 3234 (3234, 3251, 3261, 4687) 313
- Iphiona mucronata (Forssk.) Asch. & Schweinf. (4354, 4543) 157
- Iphiona scabra DC. (439, 733) 157
- *Iphiona sp. 4138 (4138) 157
- Ipomoea eriocarpa R. Br. (3951) 186
- Ipomoea obscura (L.) Ker-Gawl. (1909) 186
- Ipomoea sinensis (Desv.) Choisy ssp. blepharosepala (A. Rich.) Meeuse (1073, 1754) 186
- Iridaceae 262
- Iris albicans Lange (1318) 263
- *Iris postii Nouterde (3418) 263
- Isatis luisitana L. (415, 481, 851, 860, 1815) 201
- *Ixoliuron tataricum (Pallas) Herbert ssp. tataricum (4273) 45
- Jasminum grandiflorum L. var. floribundum (R. Br. ex Fresen.) P. S. Green (256, 309, 1330, 1682) 377
- Jatropha glauca Vahl (1224, 1942) 247
- Jatropha pelargonifolia Courb. (1935) 248

Jatropha spinosa (Forssk.) Vahl (1473, 2672) 248
 Juncaceae 265
Juncus bufonius L. (3377) 265
Juncus fontanesii Gay ssp. *pyramidata* (Laharpe) Snog. (2946, 3648) 265
Juncus punctatorius L. f. (2948, 3642, 3683) 265
Juncus rigidus Desf. (1671, 2777, 4311) 266
Juniperus excelsa M. Bieb. (238, 259, 361, 2174) 214
Juniperus phoenicea L. (5, 469, 1548) 215
Justicia flava (Vahl) Vahl (405, 584, 1236, 1538) 31
Justicia heterocarpa T. Anders. (1589) 31
Justicia odora (Forssk.) Lam. (1225, 1431) 31

Kalanchoe alternans (Vahl) Pers. (12/72, 223, 373, 1185) 189
Kalanchoe citrina Schweinf. (2114) 189
Kalanchoe crenata (Andr.) Haw. (3289) 190
Kalanchoe glaucescens Brit. (1295, 3291) 190
 **Kalanchoe* sp. aff. *glaucescens* Brit. (251, 587, 1243, 2721, 3322) 190
 **Kalanchoe* sp. aff. *laciniata* DC. (2693) 190
Kalanchoe lanceolata (Forssk.) Pers. (2115, 3193) 191
Kanahia laniflora (Forssk.) R. Br. (154/72, 582, 1677) 68
Kedrostis foetidissima (Jacq.) Cogn. (3141, 3190) 212
Kedrostis gijef (J. F. Gmel.) C. Jeffrey (1166, 1928) 213
 **Kickxia abhensis* D. Sutton ined. (2684, 4468) 445
Kickxia acerbiana (Boiss.) V.A.W. Smith (64/72, 1434, 1657, 2077, 3308) 445
Kickxia aegyptiaca (Dum.) Nab. (745, 1020, 1783, 1852, 2525) 445
 **Kickxia coralii* D. Sutton ined. (144, 797) 445
 **Kickxia elatine* (L.) Dum. ssp. *crinita* (Mabille) W. Greuter (3821) 446
Kickxia hastata (R. Br. ex Benth.) Dandy (1970, 3257) 446
 **Kickxia* sp. aff. *petiolata* D. Sutton (3339) 446
Kickxia pseudoscaparia D. Sutton ined. (438, 1133) 447
 **Kickxia* sp. nov. 3311 (3311) 446
 **Kickxia* sp. nov. 4389 (4389) 447
Kleinia odora (Forssk.) DC. (580, 1245, 2029, 2671) 158
Kleinia pendula (Forssk.) Sch. Bip. (3335) 158
 **Kleinia* sp. (2720, 3266) 158
Kochia indica Wight (4876) 122
Koelipinia linearis Pall. (61, 1017) 158
Kohautia caespitosa Schnitzl. (810, 1019, 1160) 432
 **Kosteletzkyia* sp. ? nov. (4727) 362

Labiatae 266
Lablab purpureus (L.) Sweet (3142) 314
Lactuca dissecta D. Don (38/75, 614, 3513) 159
Lactuca inermis Forssk. (auct. *capensis* Thunb.) (1408, 3435) 159
Lactuca sp. aff. *sativa* L. (1634) 159
Lactuca serriola L. (2804) 159
 **Lallemantia royleana* Benth. (501) 268
Lamium amplexicaule L. (2168) 269
Lantana salviifolia Jacq. (2034, 3109) 495
Lantana viburnoides (Forssk.) Vahl (1135, 1364, 1711, 2034) 495
Lappula sinaica (DC.) Asch. ex Schweinf. (987) 84
Lappula spinocarpus (Forssk.) Asch. (998, 1007, 2448) 85
Lasiopogon muscoides (Desf.) DC. (3390) 160
Lathyrus aphaca L. (3987) 314
Lathyrus cicera L. (368, 618, 1107) 314
Lathyrus pratensis L. (4910) 314
Lathyrus saxatilis (Vent.) Vis. (1122, 2392, 4390) 315
Launaea acanthodes (Boiss.) O. Kuntze (519, 2903) 160
Launaea angustifolia (Desf.) Muschl. (2437) 160
Launaea capitata (Spreng.) Dandy (66, 104, 793, 1055) 160
Launaea cassiniana (Jaub. & Spach) Kuntze (191, 192, 211, 1827, 1828, 2559) 161
Launaea intybacea (Jacq.) Beauv. (1702) 161
Launaea massauensis (Fresen.) Sch. Bip. ex Kuntze (242, 1406) 161
Launaea mucronata (Forssk.) Christ. (78/72, 1038) 161
Launaea nudicaulis (L.) Hook. f. (77/72, 43, 55, 81, 1059, 1835) 162
Launaea procumbens (Roxb.) Ramayya & Rajagopal (4835) 162
Lauraceae 284
Lavandula atriplicifolia Benth. (1388) 269
 **Lavandula citridora* A.G. Miller (1181, 2665) 269
Lavandula dentata L. (1088, 1720) 270
Lavandula pubescens Decne. (492, 1511, 1762) 270
Lavandula stricta Del. (743, 940, 1425, 1559, 1713) 270
Lawsonia inermis L. (316, 1967, 3722) 356
Leguminosae 285

Lemnaceae 335
Lemna gibba L. (2132) 335
Lens orientalis (Boiss.) Hand.-Mazz. (2171) 315
Leontodon laciniatus (Bertol.) Bornm. (2518, 2539) 162
Lepidagathis scariosa Nees (2969) 31
Lepidium aucheri Boiss. (1818, 2495) 201
Lepidium sativum L. (2145, 3558) 201
Leptadenia arborea (Forssk.) Schweinf. (2006) 69
Leptadenia pyrotechnica (Forssk.) Decne. (634, 1015) 69
Leucas alba (Forssk.) Sebald (372, 600, 1383, 2110) 271
Leucas glabrata (Vahl) R. Br. (226, 1524, 1740, 2612, 2687) 271
Leucas inflata Benth. (762, 1423, 1614, 2069) 271
Leucas neufizeana Courb. (1584) 271
Leucas urticifolia (Vahl) R. Br. (2614) 272
Leysera leyseroides (Desf.) Maire (62, 495, 2447) 162
Liliaceae 336
 **Limeum arabicum* Friedr. (4158) 37
Limeum obovatum Vicary (4163) 38
Limonium axillare (Forssk.) O. Kuntze (88, 1040) 396
Limonium cylindrifolium (Forssk.) Verdc. (4840) 396
Limonium thouini (Viv.) O. Kuntze (2494) 397
Linaceae 352
 **Linaria chalapensis* (L.) Mill. (3476) 448
Linaria haelava (Forssk.) Del. (430, 836) 448
 **Linaria* sp. aff. *haelava* (Forssk.) Del. (883, 894, 941, 971) 448
Linaria simplex (Willd.) DC. (615, 948) 449
 **Linaria* sp. aff. *tenuis* (Viv.) Sprengel (2524) 449
Lindenbergia indica (L.) Kuntze (138, 1447, 1638) 449
 **Lindenbergia indica* (L.) Kuntze sensu lato (sp. A.) (3588) 450
 **Lindenbergia indica* (L.) Kuntze sensu lato (sp. B.) (1994, 2027) 450
Lindenbergia sinaica (Decne.) Benth. (533, 961, 1156, 2624, 2871) 450
Linum corymbulosum Reichenb. (602, 2391) 352
Linum trigynum L. (296, 330, 2138, 2173) 352
 **LOBULARIA libyca* (Viv.) Meisner (3345) 201
Loganiaceae 352
Loniceria etrusca Santi (346, 1339) 100
Loranthaceae 354
Lotononis platycarpus (Viv.) Pic.-Serm. (27, 106, 168, 181, 509, 538, 818, 4798) 315
Lotus sp. aff. *arabicus* L. (2085) 315
Lotus corniculatus L. (1352, 1644) 316
Lotus corniculatus L. var. *eremanthus* Chiov. (1354) 316
Lotus halophilus Boiss. & Sprun. (1866, 1871, 2512) 316
Lotus lanuginosus Vent. (156, 207) 316
Lotus sp. aff. *quatinus* (Forssk.) Gillett (14/74, 366, 1312, 1366) 317
Lotus schimper Steud. ex Boiss. (1765, 1840, 2406) 317
 **Lycium* sp. nov. aff. *depressum* Stocks (2548) 463
 **Lycium* sp. aff. *depressum* Stocks (2547) 463
Lycium shawii Roem. & Schult. (187, 781, 1645) 463
Lythraceae 356
Lythrum hyssopifolia L. (1395, 2133) 357
 **Macrotyloma axillare* (E. Mey.) Verdc. var. *axillare* (3898) 317
Maerua crassifolia Forssk. (763, 963) 99
Maerua oblongifolia (Forssk.) A. Rich. (138, 177, 1051) 99
 **Maerua triphylla* Rich. (4606) 99
Maesa lanceolata Forssk. (2139, 3593) 373
 **Malcolmia chia* (L.) DC. (3486) 202
Malcolmia crenulata (DC.) Boiss. (4265) 202
Malcolmia grandiflora (Bunge) O. Kuntze var. *glabrescens* (Boiss.) Burt & Lewis (3463) 202
 **Malcolmia* sp. (864) 203
Malva neglecta Wallr. (573, 1269, 2053) 362
Malva parviflora L. (53, 91, 744, 1635, 2455) 363
Malva verticillata L. (592, 1233, 1969) 362
Malvaceae 357
Maresia pygmaeus Pomel. (978B, 4809) 203
Mariscus schimper A. Rich. var. *viridis* (Schweinf.) C.B. Cl. (2819, 2961, 3702) 222
Mariscus squarrosus (L.) C.B. Cl. (3241) 223
Marrubium vulgare L. (57/74, 1125) 272
Matthiola longipetala (Vent.) DC. (418, 479, 1848B, 2475, 4217) 203
 **Maytenus heterophylla* (Eklon & Zeyher) N. Robson (4909) 113
Maytenus senegalensis (Lam.) Exell (536, 960, 2942, 4371, 4516) 113
Maytenus somaliensis (Loes.) Cufod. (53/72, 282, 1332, 2155, 2641) 114
 **Maytenus undata* (Thunb.) Blakelock (3869) 114
 **Maytenus* sp. (3173) 114
Medicago laciniata (L.) Mill. (973, 1819) 318
Medicago laciniata (L.) Mill. var. *brachyacantha* Boiss. (932) 318
Medicago lupulina L. (3176) 318

Medicago minima (L.) Bart. (1407, 2198) 318
Medicago orbicularis (L.) Bart. (4873) 319
Medicago polymorpha L. (413, 2538, 3354) 319
Melhania incana Heyne (4607) 468
 **Melhania near muricata* Balf. f. (1458) 468
Melhania ovata (Cav.) Spreng. (247, 1193) 469
Melhania philippisae Bak. f. (1910) 469
 **Melhania velutina* Forssk. (3583) 469
Meliaceae 366
Melilotus alba Medic. (4461) 319
Melilotus indica (L.) All. (4413) 319
Menispermaceae 366
Mentha longifolia L. ssp. *schimper* (Briq.) Briq. (526, 1639, 1847) 272
Mercurialis annua L. (859) 248
Merendera abyssinica A. Rich. (200/72, 1895) 350
Meriania benghalensis Benth. (332, 1680) 272
Merremia semisagitta (Peter) Dandy (1074) 186
 **Merremia tridentata* (L.) Hall f. var. *angustifolia* (Jacq.) Van Ooststr. (1958) 187
Mesembryanthemum nodiflorum L. (2420, 2555) 38
Micromeria biflora Benth. (1800, 2881) 273
Micromeria biflora (Ham.) Benth. ssp. *arabica* K. Walth. (1132, 2197, 3479) 273
Micromeria imbricata (Forssk.) Christen. (869, 1182, 4792) 273
 **Micromeria* sp. nov. 2574 (668, 1114, 2052, 2136, 2574) 273
 **Micromeria* sp. 3247 (3247) 274
Misopates orontium (L.) Rafin. (365, 384, 607, 619, 854) 450
 **Mimusops laurifolia* (Forssk.) Friis (3279) 440
Minuartia filifolia Forssk. Schweinf. ex Mattf. (1134, 2178) 104
Minuartia picta (Sibth. & Smith) Bornm. (1011) 104
Mollugo cerviana L. (2858) 38
Moltkiopsis ciliata (Forssk.) Johnston (970, 1016, 1869, 2433) 85
Momordica balsamina L. (1068, 1759) 213
 **Monechma debile* (Forssk.) Nees (3188) 32
Monotheca buxifolia (Falconer) A.D.C. in DC. (1292, 2089, 2940) 441
Monsonia heliotropioides (Cav.) Boiss. (2937) 257
Monsonia nivea (Decne.) Decne. ex Webb (33/75, 28, 911, 1452) 258
 **Monsonia senegalensis* Guill. & Perr. (4035) 258
Moraceae 367
Morettia canescens Boiss. (919, 2163) 203
Morettia parviflora Boiss. (224, 244, 637, 675, 788, 825, 1603) 204
Moricandia sinaica (Boiss.) Boiss. (4475) 204
Moringa peregrina (Forssk.) Fiori (150, 1411, 1658) 371
Moringaceae 371
 **Myosotis ramosissima* Rochel. ex Schultes (3490) 86
 **Myrica salicifolia* Hochst. ex A. Rich. (3597) 372
Myricaceae 372
Myriophyllum spicatum L. (1351) 260
Myrsinaceae 373
Myrsine africana L. (2055) 373
Myrtaceae 374
 **Myrtus communis* L. (724, 4372, 4512) 374

Nasturtium officinale R. Br. (155/72, 1326, 1892) 204
Nepeta deflersiana Schweinf. ex Hedge (55, & 154/74, 1077, 2057, 2579) 274
 **Nepeta sheilae* Hedge & King (721, 4395) 274
Nerium oleander L. (953) 51
Neslia apiculata Fisch., C.A. Mey. & Ave-Lall. (3497) 204
Neurada procumbens L. (884) 426
Nitraria retusa (Forssk.) Asch. (725, 4369) 502
 **Noaea mucronata* (Forssk.) Asch. & Schweinf. (3851) 122
Notoceras bicornis (Ait.) Carnel (913, 1078, 1692, 1712, 1791, 2196) 205
Nuxia oppositifolia Hochst. (2605) 353
Nyctaginaceae 374

**Ochna inermis* (Forssk.) Schweinf. (1237) 377
Ochnaceae 377
Ochradenus baccatus Del. (682, 801, 1611) 418
Ocimum basilicum L. (1982, 4819) 274
Ocimum hadiense Forssk. (41/72, 249, 552, 1594, 2686) 275
Odontanthera radians (Forssk.) D.V. Field (650, 1530) 70
Oenostachys abyssinica (A. Brongn.) N.E. Br. (278/74, 2226) 264
Ogastemma pusillum Brummitt (2485) 86
Oldenlandia capensis L. f. var. *capensis* (3407) 433
Olea europaea L. ssp. *africana* (Burm. f.) P.S. Green (1329, 3532) 378
Oleaceae 377
Oligomeris linifolia (Vahl) Macbride (910, 2467) 419
Onagraceae 379
Onobrychis ptolemaica (Del.) DC. (19/74, 1103, 1832, 2143) 320

Oncocalyx schimper (Hochst. ex A. Rich.) M. Gilbert (2080, 2639) 353
 **Ononis natrix* L. sensu lato (447, 4370, 4528) 320
Ononis reclinata L. (313, 374, 610, 1310, 2170) 321
Ononis sicula Guss. (483) 321
Onopordon heteracanthum C.A. Mey. (74/74, 715, 1082, 2572) 162
Onopordon sibthorpiarum Boiss. & Heldr. (4504) 163
Onychium melanolepis (Decne.) O. Kuntze (1104) 409
Ophioglossaceae 380
Ophioglossum polyphyllum A. Br. (299, 1012, 1230) 380
Opophytum forsskahlei (Hochst. ex Schimp.) N.E. Br. (2419) 38
Orchidaceae 380
 **Oreoschimperella arabiae-felices* C.C. Townsend var. *laevis* C.C. Townsend (4578) 486
 **Origanum syriacum* L. (2912) 275
Orobanchaceae 382
Orobanche aegyptiaca Pers. (2491) 383
Orobanche caucasica Beck. (2506) 383
Orobanche cernua Loeffl. var. *cernua* (16/75, 951, 2094, 2505) 384
Orobanche cernua Loeffl. var. *desertorum* Beck (2520, 4088) 384
Orobanche cernua var. *latebracteata* Beck (2094) 384
Orobanche minor Sm. (1338, 1362) 385
Orobanche muteli F. Schultz var. *angustiflora* Beck (3553) 385
Orobanche oxyloba (Reuter) Beck var. *oxyloba* (1271, 3177) 385
Orobanche ramosa L. (1121) 385
Orthosiphon pallidus Royle (1771, 2710) 275
Osteospermum vaillantii (Decne.) Norl. (220, 230, 292, 448, 531, 1131, 1191) 163
Ostrya abyssinica Hochst. ex Steud. (2182, 2396) 438
Otostegia fruticosa (Forssk.) Schweinf. ex Penzig ssp. *schimper* (Benth.) Sebald (197, 887, 1228, 1540, 1649) 275
Oxalidaceae 386
Oxalis corniculata L. (279, 569, 1097) 386
Oxygonum sinuatum (Meissn.) Dam. (3136) 402

Palmae 386
 **Pancratium maximum* Forssk. (3403, 3859) 45
Pancratium sickenbergeri Asch. & Schweinf. ex Boiss. (4360) 45
 **Pancratium tenuifolium* Hochst. ex A. Rich. (4271) 46
Pancratium tortuosum Herbert (546, 1916, 2826, 4085) 46
 **Pancratium* sp. (4954) 46
Pandanaceae 388
Pandanus odoratissimus L. No specimen number. 388
Papaver dubium L. sensu lato (2177) 390
Papaver dubium L. var. *laevigatum* (M. Bieb.) Elkan (304, 545, 1093) 390
Papaver glaucum Boiss. (3432) 391
 **Papaver* sp. (956) 391
Papaveraceae 388
Paracaryium intermedium (Fresen.) Lipsky (478, 858) 86
 **Paracaryium* cf. *rugulosum* (DC.) Bornm. (4243) 86
Parietaria alsinifolia Del. (155/74, 2192, 2421) 491
Parietaria debilis Forst. (1792, 3204) 491
Parietaria lusitanica L. forma (5/72, 109/74) 491
Paronychia arabica (L.) Del. (1823, 2479) 105
Paronychia argentea Schur (713, 2461) 105
 **Paronychia chlorothyrsa* Murb. (1612) 105
Passifloraceae 392
Pavetta longiflora Vahl (1302, 3147, 3271, 3908) 433
Pavetta ? *pammalaka* Bremek. (1683) 433
Pavonia arabica Hochst. (4719) 363
Pavonia kotschy Hochst. (1917, 4737) 363
Pavonia patens (Andr.) Chiov. (3249) 364
Pavonia triloba Hochst. (1927) 364
Pedaliaceae (1035) 393
Peganum harmala L. (195) 503
Pegolettia senegalensis Cass. (1150, 3113) 163
Pelargonium alchemilloides (L.) L'Her. ex Ait. (3149) 258
Pelargonium alchemilloides (L.) L'Her. ex Ait. ssp. *multibracteatum* Hochst. ex Rich. (1365) 258
Pentstemon spiralis (Forssk.) Decne. (813, 1499, 2007) 70
Pentas lanceolata (Forssk.) K. Schum. (1249) 434
Pergularia daemia (Forssk.) Chiov. (269, 1487) 70
Pergularia tomentosa L. (2/75, 196, 308, 855) 70
Periploca aphylla Decne. (308) 71
Periploca sp. nov. aff. *laevigata* Ait. (1287, 2150) 71
Peristrophe paniculata (Forssk.) Brummitt (231, 826, 1591, 1769) 32
Phagnalon barbeyanum Asch. & Schweinf. (3439) 163

- Phagnalon rupestre DC. (406, 4340) 164
 *Phagnalon cf. saxatile (L.) Cass. (3769, 4977) 164
 Phagnalon scalarum Schwartz (4610) 164
 *Phagnalon sp. aff. scalarum Schwartz (2201, 2570) 164
 Phagnalon sinaicum Bornm. & Kneuch. (705, 3767) 165
 *Phagnalon sp. 1801 (1801) 165
 *Phagnalon sp. 4383 (4383) 165
 *Phlomis sp. nov. (503, 4392, 4527) 276
 Phoenix caespitosa Chiov. (173, 310, 858B, 2719) 387
 Phoenix dactylifera L. (3171) 387
 Phragmanthera sp. aff. rufescens (DC.) Balle (1248) 354
 Phyla nodiflora (L.) Greene (1208, 1640) 496
 Phyllanthus maderaspatensis L. (678, 807, 1579, 1581) 248
 Phyllanthus rotundifolius Klein ex Willd. (1905, 3896) 249
 Phyllanthus tenellus Muell. Arg. var. arabicus Muell. Arg. (3899) 249
 Physorhynchus sp. aff. chamaerapistrum (Boiss.) Boiss. (824) 205
 Picaris abyssinica Sch. Bip. (4058) 165
 *Picris sp. 933 (933) 166
 *Picris sp. 1816 (114, 185, & 282/74, 489, 833, 1816) 166
 *Picris sp. 3240 (3240) 166
 *Picris sp. 4271 (4271) 166
 Pimpinella cretica Poir. var. arabica Boiss. (736) 486
 Pimpinella eriocarpa Banks & Solander (442, 1069, 2428) 486
 Pimpinella sp. aff. eriocarpa Banks & Solander (3587) 486
 Pimpinella sp. aff. hirtella (Hochst.) Rich. 380, 2202, 2581
 Pimpinella cf. schweinfurthii Asch. (1898, 3228) 487
 Pimpinella sp. (4975) 487
 Pistacia falcata Mart. (258, 1403, 2199, 2086) 47
 Pistacia cf. khinjuk Stocks (470, 710, 4380, 4785) 48
 Pisum sativum L. var. ? arvense (L.) Poir. (1347, 3494) 321
 Pituranthos triradiatus (Hochst.) Asch. & Schweinf. (1876, 2536) 488
 Plantaginaceae 393
 Plantago afra L. (829, 3412, 4763) 393
 Plantago albicans L. (1300, 1862, 2500) 394
 Plantago amplexicaulis Cav. (901, 2446) 394
 Plantago ciliata Desf. (912, 2162, 2563) 394
 Plantago coronopus L. (1807, 2482) 394
 Plantago cylindrica Forssk. (2074, 2974) 395
 Plantago lanceolata L. (1381) 395
 Plantago major L. (1630) 395
 Plantago ovata Forssk. (850) 395
 Plectranthus arabicus E.A. Bruce (3570) 276
 *Plectranthus asirensis J.R.I. Wood ined. (276, 1196, 1554, 3552) 276
 Plectranthus barbatus Andr. (3181, 3677, 3716) 277
 *Plectranthus sp. nov. aff. barbatus Andr. (85/72, 387, 664, 2193, 3552) 277
 Plectranthus cylindraceus Hochst. ex Benth. (2959) 277
 Plectranthus marrubioides Hochst. & Benth. (4328) 278
 Plectranthus tenuiflorus (Vatke) Agnew (2688, 3169) 278
 Plicosepalus acaciae (Zucc.) Wiens & Polhill (539, 726, 1005B, 4518) 354
 Plicosepalus curviflorus (Benth. ex Oliv.) Tiegh (1331, 1439, 1572, 1974) 354
 Pluchea dioscoridis DC. (652, 1322, 1399) 167
 Plumbaginaceae 396
 *Plumbago zeylanica L. (4675) 397
 Polycarpaea repens (Forssk.) Asch. (1045, 2457) 105
 Polycarpaea spicata Wight & Arn. (58/72) 106
 Polycarpon tetraphyllum (L.) L. (2586, 3378) 106
 Polygala abyssinica R. Br. (1130, 2160, 2181) 398
 *Polygala sp. aff. abyssinica R. Br. (2987, 3103, 3394) 399
 Polygala erioptera DC. (785, 1067, 1439B, 1914) 399
 Polygala irregularis Boiss. (765, 1063, 1163, 1764) 398
 Polygala senensis Klotzsch (1987, 2712) 399
 Polygala sinaica Botsch. (712, 1830) 400
 Polygala subaphylla Swartz (1433) 400
 Polygala tinctoria Vahl (3115) 400
 *Polygala sp. 5155 (5155) 400
 Polygalaceae 398
 Polygonaceae 401
 Polygonum amphibium L. (1350) 402
 Polygonum aviculare L. (2657) 403
 Polygonum patulum M. Bieb. (1865) 403
 Polygonum setulosum A. Rich. (2680, 2926) 403
 Polyodiaceae 406
 Portulaca oleracea L. (1140) 411
 Portulaca quadrifida L. (1242, 2620) 411
 Portulacaceae 411
 Potamogeton nodosus Poir. (2194) 412
 Potamogeton pectinatus L. (4884) 412
 Potamogeton pusillus L. (2951) 413
 Potamogetonaceae 412
 Potentilla hispanica Zimm. (4927) 426
 Premna resinosa Schauer (1696) 496
 Primula verticillata Forssk. (576) 414
 Primulaceae 413
 Priva cordifolia (L.) Druce var. abyssinica (Jaub. & Spach) Moldenke (2109) 496
 Priva sp. aff. cordifolia (L.) Druce (3264) 496
 Prosopis farcta (Banks & Sol.) Macbr. (4870) 320
 Prosopis juliflora DC. (4851) 320
 Prunus cf. microcarpa C.A. Meyer (37/74) 427
 Psadia punctulata DC. (36, 92, & 159/74, 1085, 1732) 167
 Psilotrichum gnaphalobryum (Hochst.) Schinz (2030) 43
 Psoralea plicata Del. (1755) 322
 Pteranthus dichotomus Forssk. (843, 1856, 1875, 2545) 106
 Pteris dentata Forssk. ssp. dentata (1392, 2923) 409
 Pteris vittata L. (2600) 410
 Pterocarpus pulverulentus Boiss. & Bal. ex Boiss. (26/74, 319, 375, 1175, 1311) 225
 *Pterocarpus sp. nov. (2891) 225
 Pterogaillonia calycopetra (Decne.) Lincz. (689, 957, 1446) 434
 Pulicaria arabica (L.) Cass. (585, 2071) 167
 Pulicaria crispa (Forssk.) Benth. & Hook. f. (40 & 95/72, 112 & 146/74, 1142, 2468) 167
 Pulicaria glutinosa Jaub. & Spach (157, 1436, 1650, 4173) 168
 Pulicaria guestii Rech. f. & Rawi (2765) 168
 Pulicaria incisa (auct. undulata) (Lam.) DC. (444, 1789, 2463) 168
 *Pulicaria inuloides (Poir.) DC. (1593, 1687, 2205, 3233) 168
 Pulicaria jaubertii Gamel-Eldin (1669) 169
 Pulicaria petiolaris Jaub. & Spach (1272, 1588, 1949, 2200) 169
 Pulicaria schimperii DC. (160, 170, 1064, 1427, 1655, 1766) 169
 Pulicaria somalensis O. Hoffm. ssp. somalensis (1246, 3321) 169
 Pulicaria vulgaris Gaertn. (1405, 1690) 170
 Pupalia lappacea (L.) Juss. var. velutina (Moq.) Hook. f. (554, 1221, 1430) 44
 Pycnocycla glauca Lindl. (1229, 2137) 488
 Pycnocycla tomentosa Decne. (692, 2640, 4544) 488
 *Pycnocycla sp. (sp. C) (4404, 4801) 488
 Pycreus elegantulus (Steud.) C.B. Cl. (2947) 223
 Pycreus sanguinolentus Vahl (4490) 223
 Ranunculaceae 415
 Ranunculus multifidus Forssk. (1262, 1391) 417
 Ranunculus muricatus L. (4866) 417
 Ranunculus trichophyllus Chaix (1170) 417
 Raphanus sativus L. (1638) 205
 Reichardia tingitana (L.) Roth (186 & 281/74, 370, 429, 831) 170
 Reichardia tingitana (L.) Roth var. arabica (Hochst. & Steud.) Asch. & Schweinf. (1890, 3409) 170
 Reseda arabica Boiss. (1896, 2490) 419
 Reseda decursiva Forssk. (4216) 419
 Reseda muricata Presl (562, 472, 1440, 1849, 2517, 4107) 420
 Reseda sphenocleoides Deff. (1232, 1424, 1435) 420
 *Reseda sp. (876, 4812) 420
 Resedaceae 418
 Retama raetam (Forssk.) Webb & Berth. (514, 4346x) 322
 Reumuria hirtella Jaub. & Spach (732, 3444, 4890) 470
 *Rhagadiolus stellatus (L.) Willd. (289) 170
 Rhamnus disperma Ehrenb. ex Boiss. (2088) 421
 Rhamnus oleoides L. (301, 1171) 421
 Rhanterium epapposum Oliv. (32, 2404) 171
 Rhazya stricta Decne. (1521) 51
 *Rheum sp. aff. vives L. (4268) 403
 Rhizophora mucronata Lam. (4984, 5117) 424
 Rhizophoraceae 424
 *Rhynchosia buramensis Hutch. & Bruce (3270) 322
 Rhynchosia malacophylla (Spreng.) Boj. (1733, 3406) 323
 Rhynchosia malacophylla (Spreng.) Boj. vergens ad R. minima (L.) DC. (1327, 3307, 3509) 323
 Rhynchosia memnonia (Del.) DC. (166, 2986, 3254) 324
 Rhynchosia minima (L.) DC. var. minima (4175) 324
 *Rhynchosia sp. aff. minima (L.) DC. (3586) 324
 Rhynchosia pulverulenta Stocks (644, 1886) 324
 *Rhynchosia sp. aff. schimperii Boiss. (2124, 2678) 325
 Rhynchosia totta (Thunb.) DC. (3510) 325
 *Rhynchosia sp. aff. usambarensis Taub. (3152A, 3585) 325
 *Rhynchosia sp. nov. (1384) 325
 Rhytidocaulon macrolobum Lavr. (2919, 3600, 3611, 4470) 71
 *Rhytidocaulon sp. aff. macrolobum Lavr. (1470, 3301) 72
 *Rhytidocaulon sheilae D.V. Field (1304, 2619, 2705) 72
 Rhus abyssinica Steud. ex Oliv. (278, 2398) 48
 Rhus retinerrhoea Steud. ex Oliv. (277, 297, 2102, 2142, 2397) 48
 Rhus tripartita (Ucria) Grande (1797) 49
 Ricinus communis L. (2921) 249
 Robbairia delicata Milne-Redh. (10/72, 210/72, 1598, 1843, 2625) 106
 Roemeria hybrida (L.) DC. (889) 392
 *Roicissus revoldii Planchon (3538) 499
 Romulea fischeri Pax (276/74, 1550) 264
 Rosa abyssinica R. Br. (302, 1340) 427
 Rosaceae 424
 Rubiaceae 428
 Rubus cf. canescens DC. (1355) 427
 Rubus sanctus Schreb. (2644) 427
 Ruellia grandiflora (Forssk.) Blatter (1472) 32
 Ruellia patula Jacq. (336, 1212, 1475, 1945) 33
 Ruellia ? praetermissa Lindau (3253) 33
 Ruellia prostrata T. Anders. (1984, 4712) 33
 *Ruellia sp. (1420, 1610) 33
 Rumex conglomeratus Murr (4879) 404
 Rumex nervosus Vahl (1288) 404
 Rumex pictus Forssk. (949) 404
 Rumex vesicarius Hochst. (1375, 2591, 4902) 405
 Rumex vesicarius L. (895) 405
 Ruta chalepensis L. (34/74, 293, 1113) 435
 Rutaceae 435
 *Sabaea sp. (4693) 252
 Sageretia thea (Osb.) M.C. Johnst. (506, 2882) 422
 Sageretia thea (Osb.) M.C. Johnst. var. bornmuelleri (Schneid.) M.C. Johnst. (59/74, 1546, 2807) 422
 Salicaceae 436
 Salix subserata Willd. (1390, 3386) 436
 Salsola sp. aff. alopecuroides (Del.) Botsch. (3812, 3854) 122
 Salsola baryosma (Roem. & Schult.) Dandy (3470) 123
 Salsola bottae (Jaub. & Spach) Boiss. (2450, 4115, 4130) 123
 Salsola imbricata Forssk. (2783) 123
 Salsola inermis Forssk. (2856, 2857) 123
 Salsola kali L. (200, 2628) 124
 Salsola cf. schweinfurthii Solms-Laub. (1417) 124
 Salsola spinosens Moq. (1414, 1415, 2769) 124
 Salsola tetrandra Forssk. (2829) 124
 Salsola ? vermiculata L. (3447, 3471) 125
 Salsola volkensii Schweinf. & Asch. (2854, 2855) 125
 *Salsola sp. 2442 (2442) 125
 *Salsola sp. 2768 (2768) 126
 *Salsola sp. 2840 (2840) 126
 *Salsola sp. 3840 (3840) 126
 Salvadora persica L. (126/72, 165, 199, 1151, 1217) 437
 Salvadoraceae 437
 Salvia aegyptiaca L. (646, 1532, 1795) 278
 Salvia deserti Decne. (834, 1788) 279
 Salvia lanigera Poir. (2556) 279
 Salvia merjamie Forssk. (587, 596, 1100, 1177, 2119) 279
 *Salvia sp. aff. merjamie Forssk. (1266, 2050) 280
 Salvia schimperii Benth. (559, 1359, 2120) 280
 Salvia spinosa L. (1004, 2552) 280
 *Salvia sp. nov. (4968) 281
 Samolus valerandi L. (1168, 1353, 2068) 414
 Santalaceae 438
 Sapindaceae 439
 *Saponaria umbellata J.R.I. Wood (4474) 107
 Sapotaceae 440
 Sansevieria abyssinica N.E. Br. (1989, 3866, 3882) 34, 35
 Sansevieria ehrenbergii Schweinf. ex Bak. (235, 2019, 2716) 35
 *Sarcostemma sp. aff. viminale (L.) R. Br. (3186) 72
 *Sarcostemma sp. 814 (251, 814, 2828) 73
 *Sarcostemma sp. 1977 (598, 1301, 1977) 73
 *Sarcostemma sp. 3118 (3118) 73
 *Saurumatum venosum (Ait.) Kunth (4580) 52
 Savignya parviflora (Del.) Webb (1860) 205
 Scabiosa columbaria L. (1398, 2135, 2578) 226
 Scabiosa oliveri Coult. (2441) 226
 Scabiosa palaestina L. (2531) 226
 Scadoxus multiflorus (Martyn) Raf. (2116, 2681) 47
 Scandix pecten-veneris L. (451) 489
 Scariola orientalis (Boiss.) Sojak (3837) 171
 Schimperia arabica Hochst. & Steud. (40, 44, 1003, 2544) 206
 Schouwia purpurea (Forssk.) Schweinf. (1565) 206
 Schweinfurthia pterosperma A. Braun (631) 451
 Scirpus brachyceras Hochst. ex A. Rich. (2928) 223
 Scirpus holoschoenus L. (898, 958, 1202) 224
 Scirpus litoralis Schrad. (4885) 224
 Scirpus setaceus L. (4454) 224
 *Scleranthus annuus L. (3484) 107
 Sclerocephalus arabicus Boiss. (63, 1842) 107
 Scoparia dulcis L. (1922) 451
 Scorzonera intricata Boiss. (950, 2509) 171
 Scorzonera papposa DC. (2564) 171
 Scorzonera rawii Guest & Rech. f. (452, 4385) 172
 Scorzonera schweinfurthia Boiss. (4235) 172
 Scorzonera tortuosissima Boiss. (72, 1096, 1853) 172
 Scrophularia arguta Soland. ex Ait. (1600, 1971, 2141) 451
 Scrophularia deserti Del. (540, 838, 1779, 2410) 452
 Scrophularia hypericifolia Wydl. (2501) 452
 Scrophulariaceae 442
 Scutellaria arabica Jaub. & Spach (2177) 281
 Scutellaria peregrina L. (331, 571, 1255, 2042) 281
 Securinega virosa (Roxb. ex Willd.) Baill. (2603) 250
 Seddera arabica (Forssk.) Choisy (1735, 2106, 2386) 187
 Seddera latifolia Hochst. & Steud. (271/74, 1022, 1442, 1962, 2024) 187
 Seddera virgata Hochst. & Steud. (1941, 1968, 2023) 187
 Sedum hispanicum L. (570, 969B, 2588) 191
 Seetzenia lanata (Willd.) Bullock (100, 1787) 502
 Seidlitzia rosmarinus Bunge (2466, 2830) 126
 Selaginella imbricata (Forssk.) Spring (2714) 458
 Selaginella yemensis Spring (316, 1393, 2690) 458
 Selaginellaceae 458
 *Senecio asirensis Boulos & J.R.I. Wood (322, 1342, 3563) 172
 *Senecio deltoideus Less. (4615) 173
 Senecio flavus (Decne.) Sch. Bip. (33, 437, 835, 1694) 173
 Senecio glaucus L. (415, 454, 537, 852, 896, 1876) 173
 Senecio hadiensis Forssk. (3143) 173
 Senecio hoggariensis Batt. & Traub. (1710, 3341) 174
 Senecio schimperii Sch. Bip. (1363, 2128) 174
 Senecio sumariae Deff. (577, 1261) 174
 Senra incana Cav. (1979) 365
 Sesamum indicum L. (1035) 393
 Sesbania sesban (L.) Merrill (1925) 326
 Sesuvium sesuvioides (Fenzl.) Verdc. (1153, 2211) 39
 Sherardia arvensis L. (1337, 2043, 2154) 434
 Sida ovata Forssk. (1974, 3571) 365
 Sida spinosa L. (2979, 3260) 365
 Silene apetala Willd. (1706, 1846) 107
 Silene arabica Boiss. (909, 1856, 2545) 108
 *Silene sp. aff. burchellii Oth. (563, 617, 1382, 2061, 2183) 108
 Silene confertiflora Nees (986) 108
 Silene conoidea L. (364, 3496) 108
 Silene gallica L. var. quinquevulnera L. (2584, 3488) 109
 Silene linearis Decne. (955) 109
 Silene macrosolen Steud. ex A. Rich. (593, 2884) 109
 Silene schimperana Boiss. (385, 1313) 109
 Silene villosa Forssk. (893, 935, 1742) 110
 Silene vulgaris (Moench) Garcke (1344, 3500) 110
 Silene yemensis Deff. p.p. (3317) 110
 *Silene sp. 1912 (1253, 1912) 110
 *Silene sp. 4540 (4540) 111
 Silybum marianum (L.) Gaertn. (2573) 174
 Sinapis arvensis L. (2546, 4240) 206
 Sisymbrium erysimoides Desf. (3144) 206
 Sisymbrium irio L. (49, 1138) 207
 *Sisymbrium loeselii L. (4257) 207
 Sisymbrium orientale L. (3985, 4187) 207
 *Sisymbrium septulatum DC. (4218) 207
 Solanaceae 459
 Solanum alibacale Dun. (265, 939, 1537) 464
 Solanum coagulans Forssk. (119, 766, 1737) 464
 Solanum grossedentatum A. Rich. (2675, 3313) 464
 Solanum incanum L. (208, 1137) 464
 Solanum macracanthum A. Rich. (2933) 465
 Solanum schimperianum Hochst. ex A. Rich. (1251, 2062, 3178) 465
 Solanum sepicalum Dun. (10/75, 1136, 1623) 465
 *Solanum surratense Burm. f. (3731) 466
 Solanum villosum Lam. (1269, 2696, 3332, 4349) 466
 Solanum villosum (L.) Lam. ssp. puniceum (Kirsch.) Edmonds (1730, 3133) 466
 Solanum sp. aff. villosum (L.) Lam. (1542, 1592, 2696) 467
 Solanum sp. (1269, 2696, 3309, 4349) 467
 Solenostemma oleifolium (Nect.) Bullock & Bruce (727, 4373, 4758) 74
 Sonchus asper (L.) Hill (3203) 175
 Sonchus oleraceus L. (1631) 175
 Sonchus tenerrimus L. (4185, 4551) 175
 Spargula fallax (Lowe) Krause (2496, 2526) 111
 Spargularia boconii (Scheele) Asch. & Graebn. (2557) 111
 Spargularia diandra (Guss.) Heldr. & Sart. (873, 917, 918) 111
 Spargularia rubra (L.) J. & C. Presl. (4875) 111
 Stachys aegyptiaca Pers. (497, 708, 1009, 1102) 281

**Stachys* sp. aff. *aegyptiaca* Pers. (869, 892, 4793) 282
 **Stachys* sp. nov. aff. *schimperi* Vatke (1092, 1102, 1547, 2389, 2878) 282
Sterculiaceae 468
Striga asiatica (L.) Kuntze (1386) 453
Striga gesnerioides (Willd.) Vatke ex Engl. (666, 1976, 3581) 453
Striga hermonthica (Del.) Benth. (2026) 453
Stylosanthes fruticosa (Retz.) Alston (3578) 326
Suaeda aegyptiaca (Hasselq.) Zoh. (1507, 4853) 127
Suaeda fruticosa Forssk. ex Gmel. (80, 1497, 2744, 2780) 127
Suaeda hortensis Forssk. (1032) 127
Suaeda monoica Forssk. ex J.F. Gmel. (2748, 4310) 127
Suaeda pruinosa Lange (2749) 128
Suaeda schimperi (Moq.) Ulbrich (1031) 128
 **Suaeda* cf. *vermiculata* Forssk. (1872) 128
 **Suaeda* sp. 1058 (1033, 1058, 1059, 4309) 128
 **Suaeda* sp. 3841 (3841) 129
Swertia sp. aff. *polynectaria* (Forssk.) Gilg (1167, 2058, 2585) 252

Tagetes minuta L. (2949) 175
Talinum cuneifolium (Vahl) Willd. (1985, 2689) 411
Tamaricaceae 470
Tamarindus indica L. (3370) 326
Tamarix aphylla (L.) Karst. (1660) 470
Tamarix arabica Bunge (1508, 1672, 1763, 2752, 4880) 471
Tamarix aucheriana (Decne.) Baum (1578) 471
 **Tamarix macrocarpa* (Ehrenb.) Bunge (3511) 472
 **Tamarix szovitsiana* Bunge (4220) 472
Tanacetum sinaicum (Fresen.) ined. (456, 722, 3792) 176
 **Tanacetum* sp. 4274 (4274) 176
Tapinanthus globiferus (A. Rich.) Tiegh (3153, 3192) 355
Tarchonanthus camphoratus L. (257, 1289) 176
Taverniera aegyptiaca Boiss. (1039, 1881) 327
Taverniera lappacea DC. (80/72, 1036, 1882, 4746) 327
Teclea nobilis Del. (2601, 2606) 435
Telephium sphaerospermum Boiss. (1492, 3393) 112
Tephrosia apollinea (Del.) Link (14, 879, 2401) 327
Tephrosia desertorum Scheele (1513) 328
Tephrosia nubica (Boiss.) Bak. (139, 959, 1462, 2400) 328
Tephrosia pumila (Lam.) Pers. (3701) 328
Tephrosia purpurea (L.) Pers. (2787) 328
Tephrosia purpurea (L.) Pers. ssp. *leptostachya* (DC.) Brummitt var. *leptostachya* (1924) 329
Tephrosia purpurea (L.) Pers. ssp. *leptostachya* (DC.) Brummitt var. *pubescens* (Bak.) Brummitt (1586) 329
Tephrosia quartiniana Cuf. (1923, 2788, 2918) 329
Tephrosia sp. aff. *quartiniana* Cuf. (1532A) 329
Tephrosia subtriflora Hochst. ex Bak. (1960) 330
Tephrosia uniflora Pers. ssp. *petrosa* Gillett & Ali (440, 786, 1932, 2781, 3921) 330
Teramnus labialis (L.f.) Spreng. ssp. *arabicus* Verdc. (3575) 330

Teramnus repens (Taub.) Bak. ssp. *gracilis* (Chiov.) Verdc. (3529) 330
Terminalia brownii Fresen. (3706) 132
Teucrium oliverianum Ging. ex Benth. (1838) 282
Teucrium polium L. (670, 701, 719, 730, 2424, 2551) 283
Teucrium polium L. agg. 2390 (2180, 2390) 283
Teucrium yemense Defl. (1186, 2574) 283
 **Teucrium* sp. nov. (2882, 4970) 283
Thuspeinanta persica (Bois.) Briq. (3810) 284
Thymelaeaceae 473
Tiliaceae 474
Torilis arvensis (Huds.) Link (2583) 489
Torilis nodosa (L.) Gaertn. (4867) 489
Torularia torulosa (Desf.) O.E. Schulz (4253) 208
Trachyspermum ammi (L.) Sprague (1670) 490
Traganum undatum Del. (3815) 129
Tragia pungens (Forssk.) Muell. Arg. (1195, 1251, 2118) 250
Tragopogon dubius Scop. (2643, 3780) 176
Trianthema crystallina (Forssk.) Vahl (1940, 2713) 39
 **Trianthema* sp. nov. aff. *crystallina* (Forssk.) Vahl (4297) 39
Trianthema portulacastrum L. (4634) 39
Trianthema triquetra Willd. (3905) 40
Tribulus arabicus H. Hosni ined. (1619) 504
Tribulus bimucronatus Viv. (760, 1419, 3131) 504
Tribulus kaiserii H. Hosni. ined. (2427) 505
Tribulus macropterus Boiss. (2982) 505
Tribulus parvispinus Presl. (1456, 1574) 505
Tribulus pentandrus Forssk. (25, 115, 146, 830, 3227) 505
Tribulus terrestris L. var. *terrestris* (102, 116, 185, 847, 1780, 3210) 506
Tribulus terrestris L. var. *robustus* Boiss. (2542) 506
Trichilia emetica Vahl (3155) 366
Trichodesma africanum (L.) R. Br. (341, 1845) 87
Trichodesma calathiforme Hochst. (1147, 1231, 1907) 87
Trichodesma ehrenbergii Schweinf. (1158, 1523B) 87
Trifolium arvense L. (287, 2577) 331
Trifolium campestre Schreb. (1321) 331
Trifolium fragiferum L. (1320) 331
Trifolium tomentosum L. (2590) 331
Trigonella anguina Del. (3735) 332
Trigonella hamosa L. (1814, 2522) 332
Trigonella hamosa ssp. *uncata* (Boiss. & Noe) C.C.T. (4227, 4272) 332
Trigonella stellata Forssk. (84, 995) 332
Triumfetta flavescens Hochst. ex A. Rich. (553, 654, 1535) 477
Triumfetta heterocarpa Sprague & Hutch. (2033) 478
Triumfetta rhomboidea Jacq. (4608) 478
 **Triumfetta* sp. aff. *rhomboidea* Jacq. (4694) 478
 **Tulipa biflora* Pallas (887, 4778) 351
Typha domingensis Pers. (1676) 479
Typha elephantina Roxb. (3721) 479
Typhaceae 479

Ulmaceae 480
Umbelliferae 481
Umbilicus erectus DC. (450, 4382) 191
Umbilicus horizontalis Boiss. var. *intermedius* Boiss. (3, 1128, 2113) 191
Urospermum picroides (L.) F.W. Schmidt (1719, 1812, 2385) 177
Urticaceae 490
Urtica pilulifera L. (594, 820, 1726) 492
Urtica urens L. (2148) 492

Valantia hispida L. (81/74, 1744, 2191) 434
Valerianaceae 493
Valerianella dufresnia Bunge ex Boiss. (4261A) 493
 **Valerianella muricata* (Stev.) Baxt. (288) 493
 **Valerianella oxyrrhyncha* Fisch. & Mey. (4261C) 492
 **Valerianella szovitsiana* Fisch. & Mey. (4261B) 493
Varthemia iphionoides Boiss. & Blanche (4351, 4542) 177
 **Velezia rigida* L. sensu lato (2598) 112
Velloziaceae 494
Verbascum bottae Defl. (2692, 3164) 454
Verbascum decaisneanum O. Kuntze (717, 4769) 454
Verbascum longibracteatum Defl. (2049) 454
Verbascum melhanense (Murb.) Hub.-Mor. (1360, 3316) 455
Verbascum nubicum Murb. (1090) 455
Verbascum schimperianum Boiss. (527, 4347) 455
Verbascum sinaiticum Benth. (1013, 1891, 2169) 456
Verbascum yemense Defl. (184/72, 231/74, 2650) 456
 **Verbascum* sp. nov. (2091) 456
 **Verbascum* sp. (2908, 3802) 457
Verbena officinalis L. (1282, 1640, 2073) 497
Verbenaceae 494
Verbesina encelioides Gaertn. (1448) 177
Vermiflux abyssinica (A. Rich.) Gillett (1123, 2093) 333
Vernonia abyssinica Sch. Bip. (1557) 178
Vernonia cinerascens Sch. Bip. (237, 1429) 178
Vernonia cinerea (L.) Less. (2013, 3196) 178
Veronica anagallis-aquatica L. (358, 927, 2045) 457
Veronica beccabunga L. (510, 968) 457
Veronica cymbalaria Bodard (1756) 458
Veronica opaca Fries (1626, 2167) 458
Vicia sativa L. (3477) 333
Vicia sativa L. var. *angustifolia* L. (3986) 333
Vicia sativa L. ssp. *nigra* (L.) Ehrh. var. *nigra* (363, 2154, 2393, 2656) 334
Vigna aconitifolia (Jacq.) Marechal (2001) 334
 **Vigna ambacensis* Welw. ex Bak. (3904) 334
Vigna membranacea A. Rich. (262, 3165) 334
 **Viola stocksii* Boiss. (1704) 497
Violaceae 497
Viscum schimperi Engl. (671, 1894) 355
Vitaceae 498
Volutaria albicaulis (Defl.) ined. (149, 1664) 178
Volutaria lippii L. (2530) 178

Wahlenbergia lobelioides (L.F.) A. DC. (613, 2630) 93
Waltheria indica L. (3410) 469
Withania somnifera (L.) Dun. (1071, 1379) 467
 **Woodfordia fruticosa* (L.) S. Kurz (3598) 357

Xanthium cf. *pungens* Wallr. (4458) 179
Xanthium spinosum L. (2978) 179
Xanthium strumarium (2930) 179
Xerophyta arabica (Bak.) N. Menezes (2075) 494

Zaleya pentandra (L.) C. Jeffrey (1666, 1738, 1972) 40
Zannichellia palustris L. var. *genuina* Asch. (3619) 499
Zannichelliaceae 499
Zehneria anomala C. Jeffrey (645, 1215, 4477) 213
Zehneria scabra (L.) Sond. (1178, 1341, 2676) 213
Zilla spinosa (L.) Prantl (35, 1782) 208
Ziziphus nummularia (Burm. f.) Wight & Arn. (1817, 2566) 422
Ziziphus spina-christi (L.) Willd. (2794) 423
Ziziphus spina-christi (L.) Willd. var. *inermis* Boiss. (174, 1438) 423
Zoegea purpurea Fresen. (423, 954, 2527) 179
Zosima absinthifolia (Vent) DC. (461, 4391) 490
Zygophyllaceae 500
Zygophyllum album L. f. (1518, 4521) 506
Zygophyllum coccineum L. (747, 4114, 4525) 506
Zygophyllum decumbens Del. (4519) 507
Zygophyllum hamiense Schweinf. (4161) 507
Zygophyllum simplex L. (16, 795) 507

Erratum

p. 48 for pistchia read pistacia

Chascanum marrubifolium has been wrongly assigned to Scrophulariaceae; it should be entered in Verbenaceae.

p. 498 *Cyphostemma digitata*, locality should read: Between Abha and Suq al Ithnayn; among tumbled granite boulders. 6,500 ft.



Sheila Collenette has been in Saudi Arabia for some twelve years, where her husband works for the Ministry of Petroleum and Mineral Resources. During this time she has been able to undertake a considerable amount of fieldwork and gain access to difficult terrain, often due to the support and kindness offered by Saudi Government agencies.

Mrs Collenette has been a field botanist for the British Museum and Kew Gardens since 1953. Her initial botanical studies were undertaken in the jungles of Sabah and Sarawak. She was recently elected a Fellow of the Linnean Society. Her home in the U.K. is in Hampshire.

Scorpion Publishing Ltd.

Meteorology and Environmental Protection
Administration
Kingdom of Saudi Arabia
Flora Publication no. 1

